

BIRLA CENTRAL LIBRARY

PILANI (Rajasthan)

Class No:- **580.951**

Book No:- **C 53 P**

Accession No:- **50164**

CENTRAL LIBRARY

B. I. T. S.

PILANI

Acc. No. _____

1. Books are issued for *14 days*.
2. Books lost, defaced or injured in any way shall have to be replaced by the borrowers.

Acc. No
.....

ISSUE LABEL

Not later than the latest date stamped below.

--	--	--

PLANT-HUNTING IN CHINA

By the Same Author

BOTANICAL EXPLORATION

FARRER'S LAST JOURNEY

THE PLANT INTRODUCTIONS OF REGINALD FARRER

GARDENING BOOKS

RHODODENDRONS FOR AMATEURS

WILD GARDENING



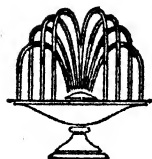
Primula

Frontispiece — PRIMULA SINENSIS

PLANT-HUNTING IN CHINA

*A History of
Botanical Exploration in
China and the Tibetan Marches*

E. H. M. COX



COLLINS 14 ST. JAMES'S PLACE LONDON

1945

To
Susan and Peter

COPYRIGHT
PRINTED IN GREAT BRITAIN
COLLINS CLEAR-TYPE PRESS : LONDON AND GLASGOW
1945

P R E F A C E

IN a book of this kind the author must owe thanks to many individuals and to many sources. It is a compilation of fact, and fact has'to be collected from here, there and everywhere. The author may, and in this case does, interpose his facts with a certain amount of explanation and a little criticism, in order that the average gardener can understand what in a more scientific work would only be of value to the specialist. But in every case the presentation of facts is the primary object.

In one respect I have broken away from the "use and wont" of botanical literature; I have not given my references. The reasons for this are several. The principal one is largely personal: for many years I have had the feeling, no doubt often wrong, that a book with masses of page symbols and copious notes can only be used as a work of reference. The eye does not move smoothly from line to line, and the brain does not follow in close harmony, if both are constantly being distracted by odd squiggles and numbers and asterisks which are signposts for the breaking of a sequence of thought. Although the story of plant collecting in China is a very large canvas peopled with many individuals wandering over a huge country, yet, oddly enough, there is a pattern, particularly in the early days, and all the pieces of the jigsaw puzzle in the way of people and places and plants fall into their right order, if one's mind is not too distracted by what is extraneous.

To those who are sticklers in such matters I can only apologise. All I can do is to state that to the best of my knowledge all the statements that I have made and all facts that have been given are accurate, and wherever possible have been checked and counterchecked. Some wild ideas have been suggested from time to time in the past, but these have been ignored.

In another respect have I departed from the usual in the spelling of Chinese place names. This is the source of everlasting and heated argument. All who have been in China will agree that the Chinese place name as spelt in a European or American atlas is hardly recognisable. Some, like Reginald Farrer, who was nothing if not bold, have tried to evolve a more or less phonetic spelling of their own, usually with disastrous results, for the simple reason that only very few Westerners know how a Chinaman pronounces his place names. We evolve a kind of double-Dutch pronunciation of our own after seeing Yangtze-kiang printed on a map, but if we see it written Yang-tzu-jiang, which is a little more like how it should be pronounced, we are completely at sea and have no idea what is meant.

Most place names mentioned in this book are, or have been, centres of collecting of plants. That being so, I have tried in every case to spell the name as it is most often found in the records of collectors and in botanical literature. Sometimes this conforms to normal geographical usage; sometimes it does not. Thus I have followed no law and have broken every rule.

Those who have helped me in this book are so numerous that if any are inadvertently left out of this acknowledgment, they must take my apologies for granted.

I have to thank the Council of the Royal Horticultural Society for their kind permission to print the letter of instructions to Robert Fortune. As always I am grateful to my friends, Sir William Wright Smith, Dr. J. M. Cowan and Mr. Johnston, the librarian, at the Royal Botanic Garden at Edinburgh for their ever-ready help, with a particular word of thanks to Mr. R. M. Adam for his search among the old photographs taken by George Forrest in the early days of his collecting. Then I must thank F. Kingdon Ward for giving me details about his itineraries and aid in compiling geographical information in the chapter on China as well as lending me several of his excellent photographs for reproduction. I must thank Dr. Merrill of the Arnold Arboretum

for permission to use and for supplying the photographs taken by E. H. Wilson.

Then my friend B. Y. Morrison of the United States Department of Agriculture has been most helpful in getting me information about that curious personality, Frank N. Meyer, and so has Professor Goodspeed of the University of California in giving me facts about Joseph J. Rock. I also thank the Editor of the *Journal of the Royal Horticultural Society* for permission to reprint the sections dealing with Robert Fortune, Ernest Henry Wilson and Reginald Farrer, which appeared in the *Journal*. Finally I owe a debt of gratitude that it would be hard to pay to William T. Stearn of the Lindley Library of the Royal Horticultural Society. His knowledge of botanical literature is immense and has always been placed freely at my disposal. His suggestions have always been excellent, and without them this book would have lost what little merit it may possess.

E. H. M. Cox.

GLENDICK,
PERTHSHIRE.

NOTE

ACKNOWLEDGEMENTS are due to the Royal Horticultural Society for the coloured Frontispiece ; to the Administrator of Botanical Collections of Harvard University for photographs taken by E. H. Wilson and for the photograph of E. H. Wilson ; to the Regius Keeper, Royal Botanic Garden, Edinburgh, for photographs taken by George Forrest and for the photograph of him ; to F. Kingdon Ward for the photographs taken by him ; and to Mr. Robert Fortune for permission to reproduce the photograph of his grandfather.

CONTENTS

	PAGE
Preface	3
Introduction	11
CHAP.	
I. <i>China</i>	20
II. <i>The Honourable East India Company and China</i>	
1. The Historical Background	34
2. The First Hundred Years	39
3. The Rise of the Professional Collector	46
4. The Chrysanthemum	59
5. An Unimportant Interval	65
III. <i>Robert Fortune and his Period</i>	
1. The first Chinese War and the Exploration of Hongkong	70
2. Robert Fortune	75
3. An Intermediate Period	92
IV. <i>The Awakening of China</i>	
1. The War of 1860	97
2. The great French Missionaries	110
3. The Russians in north-west China	124
V. <i>The Wilson Era</i>	
1. A. E. Pratt	132
2. Ernest Henry Wilson	136

CHAP.		PAGE
VI.	<i>Modern British and American Collectors</i>	
	1. George Forrest	152
	2. Reginald Farrer	170
	3. Frank Kingdom Ward	180
	4. American Collectors	191
VII.	<i>European Collectors</i>	203
VIII.	<i>The Technique of Plant Introduction</i>	214
	L'Envoi	222
	Index	224

ILLUSTRATIONS

Coloured frontispiece Primula sinensis

PLATE		<i>facing page</i>
I.	Rain forest in western Yunnan in an area under the direct influence of the monsoon <i>George Forrest</i>	14
II.	The eastern flank of the Tali range is comparatively dry, as it is beyond the influence of the monsoon <i>George Forrest</i>	15
III.	In north-western Hupeh level country is so scarce that fields are carved out of the hill-sides <i>E. H. Wilson</i>	30
IV.	Peaks of the Barrier range between China and Tibet, west of Szechuan <i>E. H. Wilson</i>	31
V.	Robert Fortune	46
VI.	<i>Rhododendron Fortunei</i> growing on limestone <i>George Forrest</i>	47
. VII.	Gigantic screes at 16,000 feet mark the limit of vegetation. This consists entirely of moraine and cushion plants able to withstand the weight of snow and cutting winds. <i>F. Kingdon Ward</i>	62
VIII.	The sub-alpine zone at about 10,000 feet. This is the area of conifer forests and the larger <i>Rhododendrons</i> <i>George Forrest</i>	63
IX.	Ernest Henry Wilson	78
X.	In Hupeh many of the finest trees and shrubs are found in rugged formation of carboniferous limestone <i>E. H. Wilson</i>	79
XI.	Wa-wu-shan in the wilderness, one of the wildest areas in China <i>E. H. Wilson</i>	94
XII.	Wa-shan, an isolated mountain of 11,000 feet with a fine flora <i>E. H. Wilson</i>	95
XIII.	Typical scrub-clad valleys of north-western Hupeh <i>E. H. Wilson</i>	110

PLATE		facing page
XIV.	Bare moorland at 13,000 feet in north-western Szechuan <i>E. H. Wilson</i>	111
XV.	George Forrest and one of the French missionaries	126
XVI.	George Forrest's camp in the Lichiang range. This was one of his best hunting grounds <i>George Forrest</i>	127
XVII.	A natural rockgarden in northern Yunnan. In situations like this are found many of the finest species of <i>Gentian</i> , <i>Primula</i> and <i>Meconopsis</i> <i>George Forrest</i>	142
XVIII.	The first photograph of the first clump of <i>Gentiana sino-ornata</i> seen by Forrest in Yunnan. This was one of his most important introductions <i>George Forrest</i>	143
XIX.	Père Mombeig, one of the great band of French missionary collectors. This mixed forest is in the cool-temperate zone at about 8500 feet <i>George Forrest</i>	158
XX.	Dwarf Rhododendrons form the moorland and take the place of Heather in western China <i>George Forrest</i>	159
XXI.	The Salween river in the dry zone on the border of south-eastern Tibet <i>F. Kingdon Ward</i>	174
XXII.	An alpine meadow at 12,000 feet. There are at least three species of <i>Primula</i> in the small area covered by the photograph <i>George Forrest</i>	175
XXIII.	Rhododendrons survive and flower profusely where the original conifer forest has been destroyed by fire <i>George Forrest</i>	190
XXIV.	Thin coppice is the natural home of many <i>Primulas</i> , in this case <i>P. Poissonii</i> <i>George Forrest</i>	191
MAPS	Wilson's Country—Hupeh and Szechuan	137
	Yunnan and the Great Collecting Districts	153
	Kansu and the Tibetan Marches	171

INTRODUCTION

THE object of this volume is to present the history of plant collecting in China in some sort of perspective. It is a very large canvas, this business of plant collecting, so large that it cannot be fairly treated from every standpoint in one volume. The author must stand at the crossroads, and decide whether he is going to turn to the left or to the right.

To the left is the straight and narrow path, the strictly scientific compilation with every written fact noted and every new plant listed whether it is the scrubbiest weed or the most aristocratic of flowering shrubs. Such a book is of the greatest scientific value; it saves a whole library of reference books; but it is not of great use to the gardener who would like to find out something of the country in which so many of his garden plants grow wild, and to learn a little of the conditions under which they were collected.

To the right the author finds a wider road, the more general account with the *minutiæ* of the business left out. But, let us hope, this sacrifice of detail will make the subject a little more readable and a little more interesting. Masses of facts and list upon list of hundreds of Latin names are tiresome.

Whichever way the author chooses to go, that way he must stick to. In this case the right-hand road is chosen. The only exceptions are in the accounts of some modern collectors. Their itineraries have been included in some detail where they have not been recorded before, or where they are difficult to understand from what has already been printed.

Sir William Wright Smith, the Regius Keeper of the Royal Botanic Garden, Edinburgh, has worked out a most interesting table showing what percentage of our garden flora we owe to each continent. Plants of Asiatic origin bulk very largely. Of them the larger portion have come from the Far

East. Again, from those collected in the Far East the greater percentage have originated in China. That this is natural may be inferred from the size and geography of that large country; that this inference is more apparent than real will be explained in the first chapter.

The great work dealing with the history of plant exploration in China is Bretschneider's *European Botanical Discoveries in China*, two scholarly volumes of extreme accuracy and painstaking research, to which this book owes much. Apart from its rarity (it is written in English and was printed in St. Petersburg in 1898), it has one failing from the point of view of the average gardener; such was the author's love of accuracy that he allowed himself no criticism, no attempt at broad outline, no generalisation, no statement that had not been proved to his satisfaction. Bretschneider certainly took the left-hand road. I have studied this book over a number of years. Except in points of nomenclature, which are obvious after a lapse of forty-six years, and a few typographical errors, I have not found one inaccurate statement, a remarkable feat in a large-sized book of more than a thousand pages.

It is, however, rather an inhuman book, the product of a purely scientific brain; and the tale of plant hunting in China is essentially human. It is a tale of trying to kick through the hard brick wall of Chinese ultra-conservatism in the old days; of the constant endeavour to bring live plants safely to Europe during the long sea voyage by the Cape of Good Hope; of pertinacity and grit during innumerable hardships while trying to wrest plants and seeds from their homes in the fierce climate of the western alps and Tibetan marches; and in a measure, of those small rivalries that go some way towards making healthy competition, almost as necessary in plant collecting as in other walks of life.

All these plant collectors without exception have passed through their trials and tribulations bravely, whether they were professional collectors or engaged in collecting as a pastime during other occupations. Several lost their lives. French missionaries like Père Soulié and Père Dubernard were

murdered; others died from illness, such as Mme Potanin, Reginald Farrer and George Forrest. All have borne themselves well and treated the natives fairly. It is an honourable calling, that of plant collector, and a happy one.

The introduction of plants from China has now been going on for more than two and a half centuries; but it differs from that from all other parts of the globe. Plant contacts with other countries have been in existence for a similar time or longer, but in none have we been dealing with a civilisation not only far older but in some ways more advanced than our own. In addition, it is one that was extremely fond of gardens and plants in their more stylised forms.

Thus the early collectors from Europe, while quite unable to explore the country and collect wild plants in bulk, had a garden flora at hand in the few treaty ports open to them. This was a flora that differed entirely from our own not only in the class of plant but in the manner it was used and in the æsthetic value placed upon it. European eyes looked upon a wonderful vista of Chrysanthemums, Peonies, Azaleas and Camellias, which were at that time completely foreign to the European conception of a garden flora. Even the symbolism which was used in the gardens and plants in the Far East provided food for thought. Towards the end of the eighteenth century things Chinese became the mode for a time.

Up to the period of Robert Fortune, in the middle of the nineteenth century, there had been only spasmodic attempts to make herbarium collections. This, of course, was due to the difficulty of access to country more than a few miles away from treaty ports. After the war of 1860 the plant collector came into his own.

For a long time it was the extreme south of China and the island of Formosa that received most attention. Much of it was attractive hilly country with an interesting, though tropical or semi-tropical, flora that lay within comparatively easy distance from the sea.

It was then that the collection of dried plants for herbarium use first started in earnest, and it is this collection, going on

now for eighty years, that has really made known to us the gigantic flora of China.

This is no place to argue about the importance of herbaria, but so many gardeners consider the collection of dried material a waste of time and think that a collector's life is an easy one that some notice must be taken and something written to prove that this is very far from the case.

Apart from the actual difficulties of travel and physical exertion of movement, what might be called the active collecting period of the day, there are many jobs to be done which are far more irksome. First comes the actual drying of the plants. This is done in presses with an ample supply of blotting paper. With fleshy plants and in wet weather the paper has constantly to be changed and dried. In any case each sheet has to be examined almost every day to see that mould has not attacked the plants, or insects eaten the best specimens. When the collector has to do this to three or four hundred sheets during the height of the collecting season, it is easy to see how much labour is entailed.

It is possible to train an intelligent native to do a certain amount of the changing of the drying paper, but the arranging of the plants in the press on the first occasion may make or mar the beauty of the specimens. Some collectors have been far more slipshod than others. Among the most beautiful specimens in existence are those made by Dr. Harry Smith, keeper of the herbarium at the University of Upsala, who has made several expeditions to China.

Once the active work of pressing is finished the collector has to write his field-notes while the memory of the plant and scene is fresh in his mind. This field-note serves a double purpose; it tells the botanist who examines and names the specimens when, where and how the plant grew; valuable information when working out the geographical area of a species; if seed is collected, it should also tell the grower something about the plant's habitat, associations, soil, climate and conditions of growth.

But we are running ahead. When the plant introducer, as





apart from the botanical collector only interested in the scientific aspect of the chase and in dried herbarium material, moved farther and farther away from his base of operations on the sea coast, he naturally had to change entirely all ideas of exporting living plants from China to that of collecting seed.

It took time to learn the new technique of growing perennial exotics from seed, a technique that is by no means perfect to-day. Previously introduction of new material had been carried out largely by means of the living plant; but this is dealt with more fully in Chapter VIII.

At the start growing new plants from seed was anything but a success. The great Delavay sent to France seeds of many new plants from north-west Yunan, where, for a time, he had the field almost entirely to himself. These were despatched mostly to the Jardin des Plantes in Paris, where they were treated more or less as hothouse plants, and promptly died. Kew, with great experience of tropical floriculture, was little better in those early days, while as late as 1898 Bretschneider hinted that it was little use sending plants or seed to the Royal Botanic Garden at Edinburgh owing to the poor treatment they received. The first half of the nineteenth century was the heyday of the greenhouse and stove for growing tropical plants. Gardeners both public and private had evolved a technique that has never been equalled, but it was a technique only suited to plants from the tropics and sub-tropics: they never realised that Western China contained countless square miles of country more alpine than the Alps and with a climate far more severe than that of the Himalayas.

The experience of the various botanic gardens tended to give hardy plants from the Far East a bad name. They were dubbed as difficult plants; and, to some extent, this is a reputation that has stuck. The cause is possibly a little due to lack of liaison between collector and gardener and scientist. If they had realised that each was a necessary cross-section of the horticultural world, advance might have been quicker. The old Horticultural Society of London began on the right lines

P.H.C.

B

more than a hundred years ago. There was co-ordination between the members. Even in the general ignorance of all things Chinese then existing there was evident a healthy desire to worry out various problems for themselves, and to pool information and resources. The gardener thought a little more of plant hunting and a little less of pot hunting.

There has been a retrograde movement since then, which has been discussed by various authors on several occasions; but so sure am I that more could be done in a more business-like manner that, at the risk of repeating much that may be redundant, I am going to return to the attack.

Some of the blame must be attached to the collector himself. In some cases owing to his scientific bent he has had little flair for the garden value of a new plant (in these strictures I speak entirely as a gardener), in others long absence from his home may have dulled his memory, in others again his critical faculty has not been working properly. From personal experience I know how easy it is to let the excitement of seeing a stranger under fresh conditions sway what might be called one's long-term judgment. A more or less ordinary plant in a perfect setting, or growing in a particularly favourable situation, may strike the collector as something super-excellent, unless his critical faculty is working freely.

Then again collectors' field-notes are often inadequate; he is often satisfied with something like the following:

"*Primula* A. A dwarf-growing plant of the alpine meadows, western slopes of the Lichiang Range at 11,000 feet. Flowers blue with white eye and white meal on flower-scape and young foliage. May 19....., No. 12345."

That means little or nothing. Even if the gardener at home sees the dried material and thinks it is a magnificent plant, this field-note does not aid him to grow it. Let me try to make an imaginary expansion of that field-note so as to increase its value to the man who wants to grow it successfully:

"*Primula A.* A plant of the alpine meadows where the sub-soil is very gravelly and obviously forms the bed of an old moraine. Basic rock of the district is magnesian limestone, but the top-soil is black, full of humus and very gritty. Situation facing due south in full sun, but the foliage is always overshadowed by leaves of larger herbs. Frozen all winter, with 40 inches of rain during the growing season between June and October. Never found solitary but always in colonies among other herbs such as *Swertia*, *Pedicularis* and *Cremanthodium*.

"A lovely plant, obviously of the *petiolaris* section with close rosette of leaves covered with meal when young. The flower-scape rises to 4 inches and carries 12 to 16 flowers of a royal blue with a real white eye. The average width of the corolla is $1\frac{1}{2}$ inches. This differs in colour from any other *Primula* I know and is obviously worth any amount of trouble to keep alive in the garden, although this may be difficult owing to the fleshy root-stock which may suffer from a mild and damp winter. May 19....., No. 12345."

That is by no means perfect, but it does give some information which might help the gardener to manufacture the somewhat artificial conditions necessary to its particular constitution. It is doubtful if he would succeed, but he would have more chance with the fuller field-note.

It is now the turn of the gardener. He rarely reads enough about exotics; nor, for that matter, are the writers in the horticultural press as helpful as they might be. If he were to delve deep enough into the history and literature of plant exploration, he would usually find somewhere a detailed description of the country in which was found the plant in which he was particularly interested. But will he take the trouble? Nine times out of ten he tries to force the plant to adapt itself to the standardised conditions that he provides in his garden. Some will survive this treatment; others object and pass away. Not all of the plants that have disappeared from ken in the past forty years have been very difficult or

finicky, insisting on specialised conditions hardly obtainable in cultivation.

Thus the collector could give more information, and the gardener take more pains to assimilate such information as is given him. If this were done regularly, I think that the numbers of plants that refuse to respond in gardens would be much reduced; also that a great deal of time would be saved, as sensible people would not try to grow plants which obviously have only the very slightest chance of coming to maturity.

The scientist could also help. Seed that has had to travel many thousands of miles during many weeks may lose its viability in sudden changes of temperature and moisture far quicker than seed safely stored in a warehouse. Much has been accomplished by way of stratification and other means in improving the germinating qualities of seeds that are notoriously slow or chancy, but little scientific work has been done in experimenting how the viability of seed could be improved by chemical or other means. Nor has anything been done to improve containers for the carriage of seed. Thermos flasks and similar gadgets have been used by George Forrest and other collectors, but there is no proof that they are any better than the usual empty cigarette tin.

There are other points of contact with the scientist. Has anything been done to see if the diminution of air pressure at high altitudes has anything to do with the difficulty of cultivation of high alpine? Again, over ninety years ago seeds of short viability were sown in boxes *in situ* so that they might germinate during the slow voyages of those days. Up to a point this practice proved very successful, so much so that its intelligent continuation might solve some of our present-day difficulties.

This improved liaison between scientist, gardener and collector might hasten the popularity of a new plant, where in the past delay has been prolonged. It is only necessary to point out some of E. H. Wilson's introductions to show how delay has been strung out to great lengths: *Acer griseum* only

became obtainable in the nursery trade about twenty-three years ago, twenty-five years after its introduction; *Rhododendron insigne*, one of the most charming of his Hupeh finds, could not be purchased until 1935, although it was introduced in 1910; *Staphylea holocarpa* is still extremely rare, while its pink form, *rosea*, up to a few years ago could only be bought in France. Those are only a few examples. If more trouble had been taken at the start, there is no reason why these plants, all excellent in their way, should have had to wait so long before their worth was recognised.

But this is a divergence.

CHAPTER I

CHINA

IN THIS volume some attempt is made to treat the botanical exploration of China as late as 1900 as a consecutive account. Up to this date the extent of the exploration depended almost entirely on political and trade associations with European powers. This is no story of a gradual infiltration along recognised trade routes with the development of our knowledge increasing steadily year by year as more fresh ground was covered. When finally China was completely opened to foreign travel, it was the professional man or the missionary, not the trained scientist and specialist collector, who began to collect botanical and zoological specimens.

During the first century and a half of European intercourse the geographical side of plant collecting was of no importance at all. As no foreigners were allowed farther than the immediate neighbourhood of a few specified treaty ports (at that time limited to Macao and Canton), nothing was known of the wild flora. They had to limit their interest to the garden flora which was composed largely of a few special genera. Some plants in their wild form, such as *Viburnum fragrans*, have been generally popular with northern Chinese gardeners, but such plants are very few. The usual Chinaman cared little where such plants came from. In the general complete ignorance about the interior of the country it made little difference if gardeners were told that a plant came from Siku or Li-ti-ping.

It was only after the war of 1860, when the country was opened to Europeans to travel as they willed, that the extraordinary richness of the flora began to be suspected; but realisation of the wealth of the far west came very slowly. As late as 1899 the intelligent firm of Veitch told E. H. Wilson,

then at the threshold of his career, that there was little left to collect in China.

The first provinces to be explored were naturally those of easiest approach from the sea, Kwangsi, Kwangtung, Fukien in the south, Chekiang and Kiangsu in the centre, and Shantung and Chihli in the north. The climate of the southern provinces of Kwei-chow and Hunan is tropical or sub-tropical and thus they have a flora that is not of the greatest value to gardens in more temperate zones, while the flora of Chihli in the north is not wildly exciting.

Inside this first rim of sea-girt provinces lie the central provinces of Kiangsi, Anhwei, Eastern Hupeh, Honan, part of Shensi and Shansi. While of enormous importance from the agricultural side, their flora for the most part is extremely dull. These provinces carry such an enormous population that every acre of ground capable of raising a crop is cultivated. This, of course, tends to lessen the indigenous flora.

In addition, many of the lower hills and plains of North China are formed of loess. This is the fine dust of Central Asia deposited during countless years into layers varying from a few inches to hundreds of feet in thickness. This loess bakes hard in summer and turns into a particularly unpleasant glue-like clay in the rains. It cannot be expected to carry an interesting flora.

That means that out of the nineteen provinces of China proper only six are of real interest to those who garden in the temperate zones: these are from north to south Kansu, Shensi, Szechuan, Hupeh, Sikang and Yunnan. To these must be added the feudal Tibetan states of the border, really a no-man's land, although usually admitting the suzerainty of China for their own convenience. They are not large but are extremely important botanically. Among them are Choni, Muli and Mupin.

Kansu in the extreme north-west of China proper is influenced climatically almost entirely by the high plateau of Tibet and the desiccated lands of Inner Mongolia that lie to its west and north. Every traveller speaks and writes in far

from civil terms of the devastating wind that blows constantly from the north-west, a prevailing wind that is cold, piercing and dry.

While eastern Kansu is largely made up of loess, western Kansu is extremely mountainous with no definite central backbone, unless, possibly, the entire Min-shan range can be called a backbone. Most of the ranges and their subsidiaries are limestone and vary little in altitude with the result that the consistent north-west wind blowing from the intensely cold and dry wastes of Central Asia encourages desiccation. Farrer called them the Stone Mountains, "perfectly pitiless and impregnable they are; not even snow can lodge on their inhospitable flanks, unless in some deep ghyll or couloir. They are naked as Truth, and almost as unattainable. . . . For the Min-shan, a tossing hedge of pikes and minarets, gives more impression of insatiable ill-temper and austerity than any range I know. Darkness is always brooding along their sullen brows, and even the streams are afraid, and flee away as fast as they can."

Most of this country has only a short rainy season in July and August, and much of it is more or less treeless except in a few sheltered oases and in the valley bottoms. That is the reason why Farrer almost completely ignored trees and shrubs in *The Eaves of the World* and *The Rainbow Bridge*; there were very few to collect considering the size of the country, except such universal plants as *Potentilla fruticosa*.

It is only when an enormous mountain mass like the Amne Machin range, which towers to 25,000 feet, acts as a shelter from the north-west that climatic conditions become less arid. Tebbu-land lying to the south-east of the Amne Machin massif in the more southerly areas of the Min-shan is a good example. Though equally mountainous the drying winds are stopped by the higher range to the north-west. The country is thus blessed with a more normal rainfall and the hillsides are clothed with fine forests.

The flora of this north-western corner of China cannot compete with that of Hupeh, Szechuan or Yunnan either in

variety or in richness. This must be largely due to climatic conditions, as both Farrer and the many Russians who have specialised in the scientific exploration of north-western China mention the dolomitic character of many of the ranges, a formation that usually tends towards a fine flora.

In a letter to Professor Sargent at the Arnold Arboretum, J. J. Rock sums up the varied character of that whole large area as follows:

“When travellers or geographers speak of the forests of the Kokonor, they can mean no other than the forests of the upper Yellow River, viz., the Amne Machin and below, for there are no forests north of the Amne Machin. General Pereira, whose journal I have, speaks of not seeing either a tree or a shrub until he reached Jekundo, 18 stages from Tankar, and Jekundo is in Eastern Tibet and not in the Kokonor. It is true huge logs are rafted down the Yellow River to Lanchow, but they all come from the upper Yellow River, that is the forests of the Amne Machin. I found out that at Dulanssu was only a grove of trees, one species of spruce and one of oak, facing a monastery. People used to bare hills are apt to call a grove of trees a ‘ta lin ku’ or large forest of big trees. Of all the regions of Kansu that I have seen so far, there is none that can compare with the Tebbu country, which is a perfect paradise for a botanist or a dendrologist. The mountains of Sining and the huge divide between the Sining and the Yellow River are absolutely bare of trees, not even shrubs are visible, and Farrer could only have been out for flowering plants such as Primulas, Meconopsis, etc., which are apparently plentiful in early summer.”

This Tebbu country is the same as the Tepo country mentioned so often by Farrer. It lies in the Min-shan range, near the watershed between the rivers flowing south to join the Yangtze and those flowing north to join the Yellow River.

The Yellow River, or Hwang-ho, the most northerly of

the great rivers of China, has little bearing on plant life so far from its mouth. It is well known as the most turbulent and untamable of the big rivers. If you care to follow its course on a map, you will see how independent it is. Rising in the middle of the great Tibetan plateau, it begins by flowing south-east, then turns north and circles the Amne Machin massif before bending north-east to Lanchow. Then it takes an enormous sweep northwards, round that curious desert of Inner Mongolia called Ordos, before striking due south and finally east near where Shensi and Honan join.

To the east of Kansu lies Shensi. Botanically this is important because of one main range, the Tsin-ling and its subsidiaries, that runs from west to east across it, almost cutting the province in two. It runs with scarcely a break into the Min-shan and other high ranges of southern Kansu.

The Tsin-ling is still one of the least explored areas in China, although it is the nearest of the big mountain ranges to civilisation. David and one or two Russians have done most work there, also the German explorer, Wolfgang Limpricht, but in each case only a small section of the range was covered. It is realised that much remains to be done in this interesting area, but for many years it has been extremely unsettled and given to banditry of the more robust Chinese kind, a strong deterrent from intensive exploration.

Apart from its great interest, the Tsing-ling serves the useful purpose of acting as a buffer against the encroachment of the loess. North of the range is typical loess-land with caked mud hundreds of feet thick. To the south of the range there is no loess.

South of Kansu lies Szechuan, one of the largest provinces, which contains the wonderful Chengtu plain, possibly the most fertile area in the whole of China. Between this plain and the uplands of Tibet is a great range of mountains running almost due north and south. Unlike Kansu and Yunnan there is little limestone in this range. The lower spurs often consist of mud shales which disintegrate rapidly in heavy rain and cause frequent landslides for which the

upper reaches of the Min River bear an unenviable reputation. It was in this area that Ernest Wilson broke his leg in 1910.

Near Sungpan in the extreme north-west there is a certain amount of tufa, while in the south are the important limestone outcrops of Omei-shan, Wa-shan and Wa-wu-shan, among the richest botanical areas in the whole of China.

The Min River, which rises in Tibet north-west of Sungpan and flows in a general direction almost due south, may be called the boundary between Szechuan proper and feudal states, such as Mupin, which are technically included in the province. To the east of the Min River lies the red sandstone Chengtu plain. Thus the part of Szechuan of particular interest to us is that lying to the west of the Min River.

This area of hill and valley runs from about 6000 feet in the lower ranges to over 25,000 feet in the main range. In all this area the climate varies enormously, but nowhere is it dominated by prevailing winds such as the south-west monsoon, which is experienced in north-west Yunnan, nor by the dry north-west wind of Kansu. On the other hand one cannot lay down rules that the farther north one goes the colder it becomes. Actually some of the valleys converging on the upper Min River, where erosion has been severe and the country for many miles has been entirely denuded of trees, are very hot considering altitude and latitude, with a flora that consists almost entirely of xerophytic plants. Then again the extremely broken country lying in a triangle between Mount Omei, Wa-shan and Wa-wu-shan is notoriously wet, for no obvious reason, so much so that even the Chinese fight shy of it and call it the Laolin or Wilderness.

The eastern extremity of Szechuan turns again to carboniferous limestone which is such a feature of north-west Hupeh. Here there is another welter of hill and valley, not outstanding in altitude, varying from 5000 to 10,000 feet for the most part; but whether by erosion or actual folding the valleys are narrow and gorge-like, and the hills correspondingly steep with a remarkable number of cliffs. In these hills

the climate is wet without being excessive, although the hills ooze moisture. The combination of climate and limestone has made this extremely rich in woody plants of all kinds: in fact, it is possible that western Hupeh exceeds all other parts of China in the richness of its tree and shrub flora.

Notwithstanding the fact that much of the low-lying ground of Szechuan and Hupeh is sub-tropical, it is probable that the plants introduced into cultivation from higher altitudes in those two provinces have, on the whole, proved more amenable in gardens than those from Yunnan and Sikang in the south and western Kansu in the north. It is difficult to assign a definite reason. Possibly one factor may be that many of the plants from Yunnan come from areas which are influenced by the monsoon, which means an ample supply of water during the growing season and drought during winter. Kansu, from entirely different reasons, also has a moist summer and a very dry winter. In the British Isles the seasons are so often reversed. But Szechuan is influenced neither by the monsoon nor by the same conditions as Kansu: its climate is more liable to ups and downs not unlike ours. At any rate there are only a few of Wilson's introductions that are not hardy, and, what is more, good growers; and that is more than can be said for many of the Yunnanese plants.

Although a number of provinces of south China, such as Kweichow, Hunan and Kwangsi, are mountainous to a greater or lesser extent, yet the hills are not sufficiently high to counteract the sub-tropical and tropical climate. Botanically their flora is very interesting, but it is closer allied to that of Siam and French Indo-China. Thus we are left with the great province of Yunnan from which in recent years more plants have been introduced to Europe and the United States than from the whole of the rest of China together, and the new province of Sikang, which has been carved out of Western Szechuan and north-western Yunnan.

What is more extraordinary is that almost all this quantity

of new introductions has come from the north-west quarter of Yunnan. South of Yunnan-fu which lies exactly on lat. 25° North, the flora again approximates that of its neighbours, Siam and French Indo-China. Here again there are many interesting plants, as was proved by the collections made by Augustine Henry when he was stationed at Mengtze and Szemao in the very south of the province. In 1940 Professor Yü again collected in this part of the country. But here again very few of the plants will grow unaided in the temperate zones. There are some, like *Jasminum primulinum*, collected near Mengtze in the extreme south, which have proved hardy, but they are the exception.

It is to the north-west that we must look, and that no-man's land round Atuntze which is shown on maps as part of China, but is really Tibetan, although now and again the Chinese exert their authority. There is another area of doubtful ownerships farther east between the Yangtze and the Yalung rivers. This may be equally important botanically, although this is doubtful, but it has never been thoroughly explored. It is inhabited by the Lolos, a tribe that are completely independent and do not like visitors whether Chinese or foreigners.

The boundary between China and Tibet has always been fluid. For instance, for a long time Batang has been shown on British maps as belonging to China with the Tibetan boundary running a little to the west; but most French maps show, and have shown for many years, Batang, or Baan-fu as it is now called, as lying well within Tibet. Ethnographically the French are probably more correct, as Batang is an essentially Tibetan town.

The latest political reorganisation in that part of the world shows a new province called Sikang with Batang (Baan-fu) as the capital. This has been carved out of western Szechuan and north-western Yunnan, and includes a large stretch of country north and south of the main Lhasa highway from Tatsien-lu through Litang to Batang. Whether a redistribution of names makes the indigenous population any more

pro-Chinese remains to be seen. For the purpose of this volume the old divisions will be kept.

The climate of north-west Yunnan depends largely on its very curious geographical features. Here we have three of the biggest rivers of Asia running cheek by jowl for hundreds of miles with scarcely 50 miles between them.

There are several geological suppositions for this phenomenon. All south China was land during the Tertiary period when the Himalayas and Tibet were uplifted. Some authorities say that north-west Yunnan may have been squeezed when this tremendous earth movement took place.

But Kingdon Ward tells me that this part of Yunnan consists of what is called a dissected plateau. It was dissected first by ice about 100,000 years ago, and secondly, and far more effectively, by water within the last 50,000 years.

The three rivers from west to east are the Salween, the Mekong and the Yangtze. They rise not far from each other in a comparatively small area in the high plateau of eastern Tibet, not very far from the source of the Hwang-ho. Still farther to the west runs the Irrawaddy, the great river of Burma, formed by two main confluent, the Mali-hka and the N^omai-hka.

The upper half of all the valleys through which these rivers run is usually smooth and undulating, typical results of glaciation. The bottom half of the valleys are chasm-like, where the rivers have cut their way deeper and deeper down through the rock. The Mekong is particularly precipitous, and has few tributaries, other than short mountain torrents, owing to the narrowness of its basin. At latitude 26° 30' N. an airline of 18 miles would join the east and west limits, while in latitude 26° 50' N. a line of 40 miles would span it together with the basin of the Salween.

M. Peronne, a French musk buyer, who lived for many years at Atuntze, knew the country as well as any European. He has recounted how on several occasions he has travelled from the west bank of the Salween to the east bank of the Yangtze in a week. This included crossing three great rivers

and two mountain ranges with passes of more than 16,000 feet. He said that natives did it in five days.

Although the valley bottoms are often mere clefts cut in the living rock, the upland valleys and hilltops are often rolling down-land. George Forrest and Kingdon Ward have described how often there are marshy plateaus of quite large extent on the top of the ranges. This, of course, only applies to some; others are rocky, with huge precipices, and are even dolomitic in their formation.

Contrary to the general idea almost all these ranges are formed of hard, grey, magnesian limestone. That this is the case in ranges with such a wealth of *Rhododendrons* and *Primulas*, so many of which are supposed to be calcifuge, always astounds gardeners; but here is a quotation from a paper by George Forrest read before the Royal Horticultural Society on July 20th, 1915: "Recently there has been much discussion regarding lime and ericaceous plants, especially as applied to the cultivation of *Rhododendrons*. As already mentioned, most, if not all, of the mountain ranges of W. and N.-W. Yunnan are solely limestone formations, and it is on those the greater number of the *Rhododendrons* are found. I am not in a position to give a decided opinion, but this I can state positively, that most of the *Rhododendrons* I have collected in that region grow directly in, or on, pure limestone."

While the Salween and the Mekong have made more or less parallel courses running almost due north and south, the former reaching the Bay of Bengal near Moulmein in Burma, the latter the China Sea in Cochin-China, the Yangtze takes an extremely erratic course. It flows parallel with the Mekong and the Salween until it comes opposite the town of Lichiang. There it takes a sudden bend to the north for about 60 miles before it doubles back again on itself and flows south-east again. In the first of these triangles, as it were, lies the famous Chungtien Plateau. This is about 80 miles long and 20 broad at an elevation of 12,000 feet, a fine area for plants. In the corresponding triangle, called the Lichiang Bend, lies the

great Lichiang range, with snow peaks up to 20,000 feet, one of the greatest areas for plants in the whole of China. Forrest explained that much of the plain at the foot of the range was very dry owing to the streams disappearing in the lower flanks of the hills and reappearing far out in the middle of the plain. Then he went on: "However, the bleak and barren nature of the plain is compensated by the prodigality of the mountain. From the base to the limit of vegetation at 17,500 feet, the range in its whole extent of fully fifty miles is one huge natural flower garden. The extreme height of the range is almost 20,000 feet; there is therefore about 3000 feet of perpetual snow."

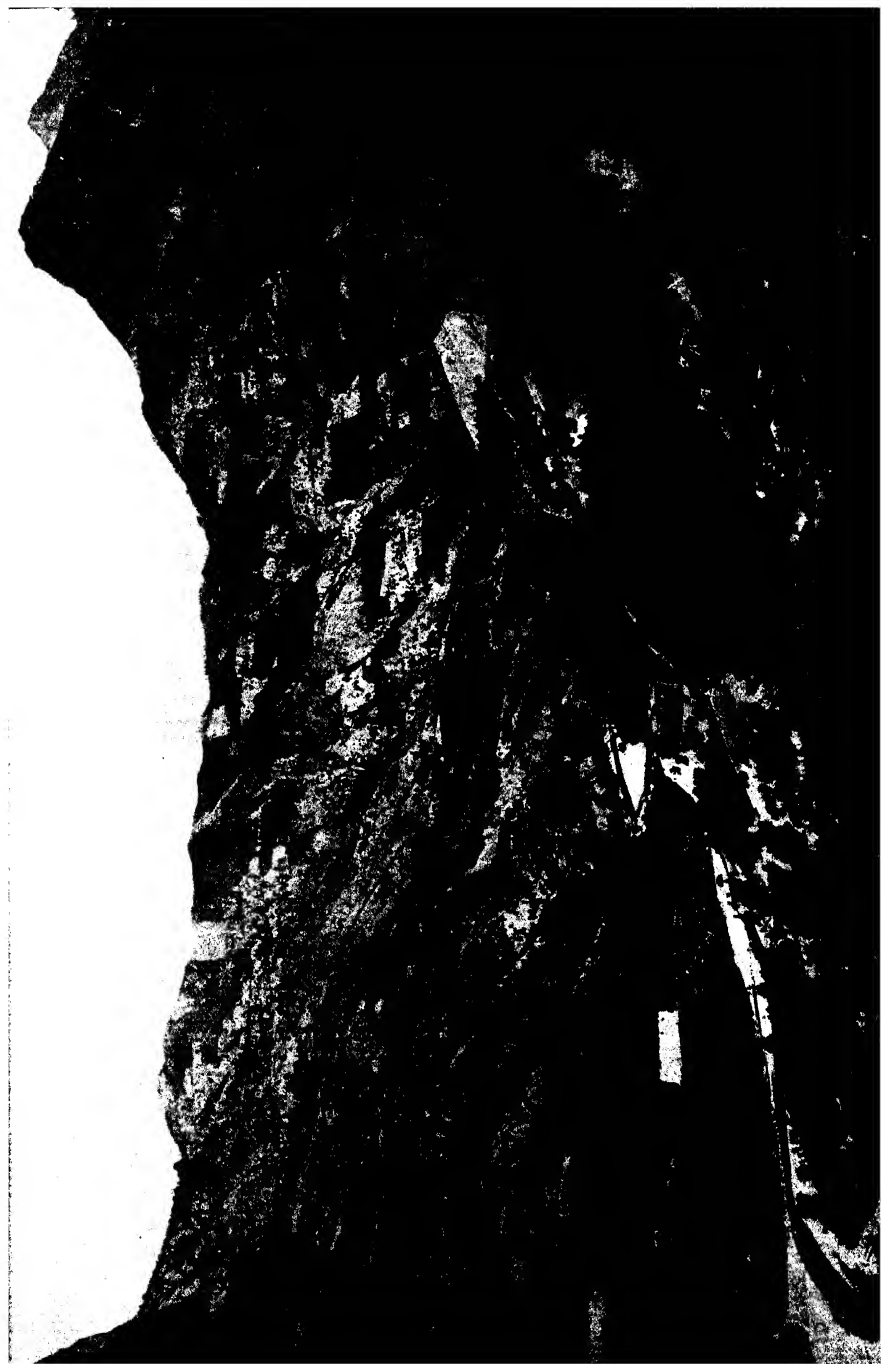
As this is typical of a Yunnan hunting ground at its best, we can discuss the various levels with slightly more detail. From 7000 feet to 10,000 feet, there is a belt of trees and shrubs, full of fine hardwoods, the lower-level *Rhododendrons* and such shrubs as *Buddleia*, *Berberis*, *Deutzia*, *Gaultheria* and *Vaccinium*. Next comes the Conifer belt from 10,000 to 11,500 feet. Here are found in the ascending scale *Pinus Armandii*, *Tsuga yunnanensis*, *Abies Delavayi* and *Larix tibetica*. In the open glades are *Incarvillea*, *Anemone*, *Aconitum*, *Cypripedium*, *Delphinium*, and a number of Lilies.

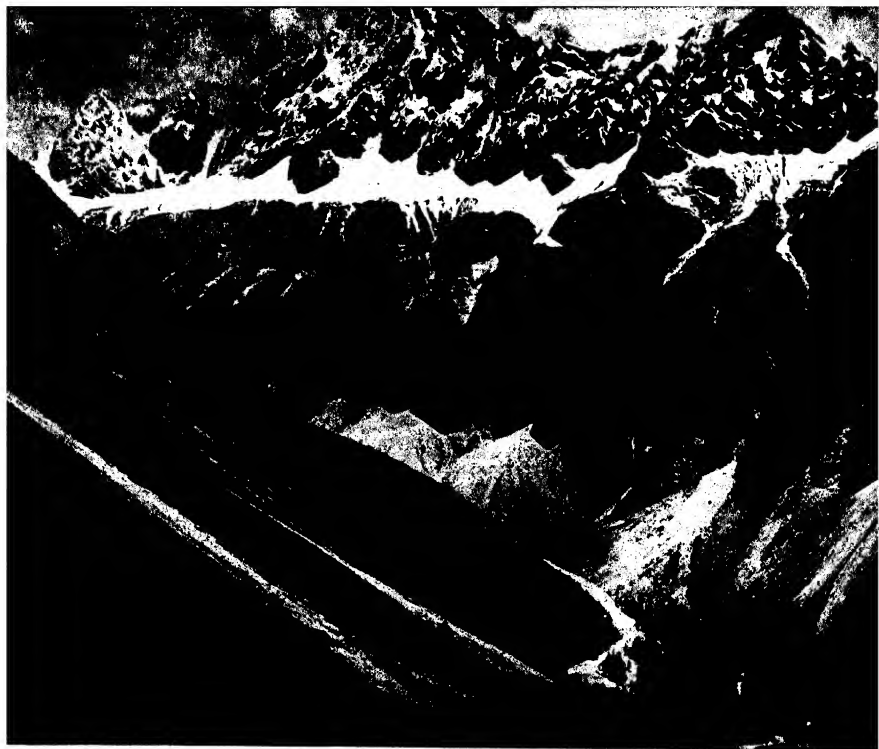
Some sections of the eastern flank of the range have been worn away to a series of graduated cliffs. On these ledges grow such plants as *Primula Forrestii* and *Dracocephalum bullatum*. Above the Conifer belt are moister meadows, the home of *Primula Littoniana* and *Meconopsis integrifolia*.

George Forrest always said that the cream of the flora was in the alpine pastures and on the enormous screes that lie from 12,000 feet to the limit of vegetation. *Compositae* of all kinds, Gentians, Primulas such as *P. sonchifolia*, *P. secundiflora* and *P. calliantha*, dwarf *Rhododendrons* such as *R. Sargentianum*, *R. intricatum* and *R. prostratum*. The last grows at the highest altitude, over 16,000 feet.

Is it any wonder that such a range is a plant-hunter's paradise?

The climate of north-west Yunnan is governed to a great





IV.—PEAKS OF THE BARRIER RANGE BETWEEN CHINA AND TIBET, WEST OF SZECHUAN

extent by the south-west monsoon that sweeps its rain-laden clouds from the Bay of Bengal across Upper Burma to China. But by the time it reaches the frontier it tends to lose its force. Ranges in Assam and Burma retard its flow sufficiently to get an enormous precipitation poured over themselves, but such is the amount of moisture carried that plenty is left in the clouds. Once the monsoon clouds across the frontier any particular high mountain or range interfering with them will cause great precipitation, but what lies behind will be dry. The watershed between the Irrawaddy and the Salween is fairly regular, varying from 11,000 to 15,000 feet, but with sweeping arrêtes and no sudden peaks. The consequence is that the rainfall is evenly distributed over the Irrawaddy-Salween divide and over the narrow and precipitous Salween basin as far as the west flank of the Salween-Mekong divide. But this latter divide is much higher on the general average than the Irrawaddy-Salween with the consequence that the monsoon is denuded of much of its moisture. Thus the eastern slopes of the Salween-Mekong divide and long stretches of the Mekong valley are extremely dry, very different from the Salween valley only a few miles to the west. (See map on p. 153.)

The same occurs in other more isolated ranges. For instance the Tali range has a long stretch of rolling country to the south-west before the Mekong-Salween divide is reached, and this is comparatively low at that latitude. Thus the monsoon hits the west flank of the Tali range with great force. The western side of the range consists of slopes of often impenetrable rain-forest. But this breaks the monsoon, and the east flank is very dry in comparison.

Thus it is quite impossible to lay down hard and fast rules about the climate of Yunnan. Plants may come from a dry or soaking area, and yet live within a few miles of each other. When the monsoon fails, as it does occasionally, large stretches of the country are desiccated. Then bush fires become common and mile upon mile is left desolate. Both Forrest and Kingdon Ward have travelled through areas that

have been stricken by drought with naked skeletons of *Rhododendrons* and other shrubs rising from a hard-baked earth.

It is so common to imagine Yunnan as a country possessing a universal water supply, that I must stress again the existence of areas where the rainfall does not exceed 20 inches in the year next those where the rainfall exceeds 80 inches. As a rule the comparatively xerophytic flora of the dry areas is of little interest in gardens, and most collectors have left such areas alone.

While local conditions cause variations, as a rule the snow line is about 17,500 feet on a general average. But the snow lies below this for several thousand feet until late in the summer, the winter fall as a rule increasing as one goes east and comes more under the influence of the continental climate. Although the rainfall may diminish, as one goes eastwards and the south-west monsoon loses its intensity, yet the flow of the rivers over the same area of watershed may actually increase owing to the greater volume of snow-water.

In a limestone country like north-west Yunnan this combination of rainfall and snow-water means that the upland valleys and plateau are nothing more nor less than gigantic screes with a constant and large underground flow during the growing season. In monsoon areas this flow is so important a constituent of the growing period that many plants grow to a very large size in pure gravel. *Gaultheria trichophylla* and *Primula dryadifolia* are examples. Single plants have been found forming clumps more than four feet across, with their root systems going down a long way through various strata of gravel.

Facing this page will be found a chart illustrating the various zones of vegetation. This is a version founded on one worked out by E. H. Wilson and applies particularly to Hupeh and Szechuan. Its divisions, however, are more or less true for the whole of the western provinces, unless extraordinary local conditions cause exceptions; but even these as a rule do not extend more than a few hundred feet.

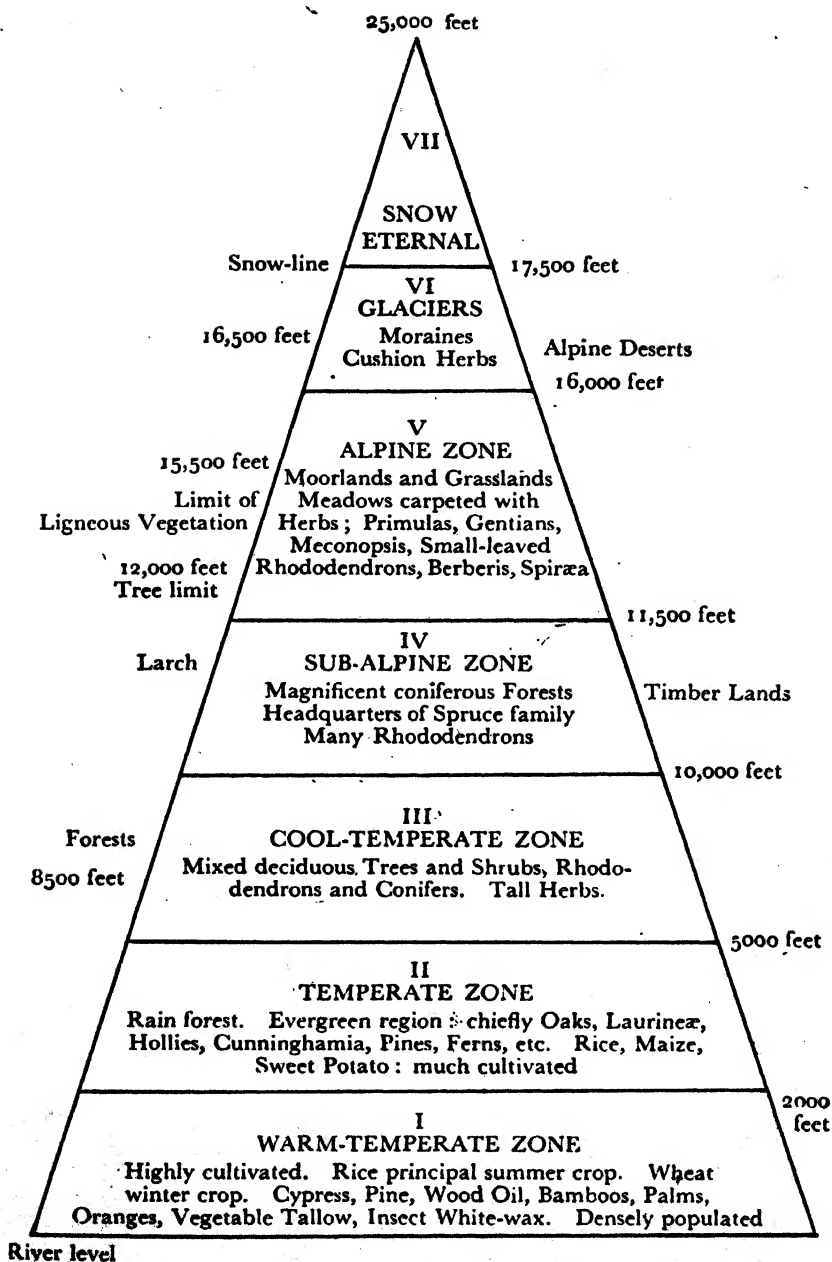


CHART ILLUSTRATING ZONES OF VEGETATION

CHAPTER II

THE HONOURABLE EAST INDIA COMPANY AND CHINA

I

The Historical Background

AS A RULE scientific exploration throughout the world has been so far removed from all political and commercial influences that botanical collectors have frequently been the first pioneers in parts of the world hitherto untrodden by Europeans. They have, as it were, launched their ships into the blue with a reckless regard for personal safety. Considering all things, a surprising number have come through safe and sound.

There are almost hundreds of examples of these pioneers: Hooker, Ball and Maw in the Atlas Mountains; Griffith in many parts of India, including the country round Sadiya and the Hukong valley in Upper Burma; Douglas in what is now British Columbia; Brass in West Africa; Darwin in the island of Chiloe, and so on.

One country, however, China, resisted all efforts at penetrations for centuries, and resisted successfully. The policy of exclusion and seclusion was so rigorously enforced that to all intents and purposes it was complete, far more so than in the case of its neighbour, Japan. This is the outstanding case of a country where scientific search for knowledge has had to follow humbly in the footsteps of political and commercial treaties; where, until this century, freedom of access has been strictly proscribed within very definite bounds. In order to understand the slow progress of actual botanical exploration, as distinct from the introduction of plants developed by the Chinese themselves as part of their garden flora, a short historical survey is necessary.

In the dim ages Nestorians had proselytised extensively in China with considerable success. In the Middle Ages, in addition to Marco Polo, there are a few records of Europeans having reached China, but all reached the Far East by a land route. Among them were two great wanderers during the fourteenth century, Odoric and Marignolli. These were exceptions. So secluded did the Chinese Empire keep itself that when in 1516 the Portuguese first came to southern China by sea they failed to identify it with the far-famed Cathay which had always been reached previously by land. They heralded it as a new discovery.

The Portuguese at the time of their greatness were indefatigable in their desire to find out what lay round the next corner. After conquering Malacca in 1511, it was natural that they would sail farther and ultimately rediscover China. They soon realised the importance of their discovery, and for nearly a century managed to monopolise completely the China trade with Europe. Their imports from Europe were mostly confined to woollens, but their ships carried large cargoes from their Indian colonies, including pepper and spices. They exported many Chinese products, including the famous China Root, *Smilax glabra*, Rhubarb and Camphor, but not, oddly enough, Tea.

It is curious that the Portuguese never produced a botanist, even an indifferent one, during the whole period of their eastern empire. They had a completely virgin field in which to work, but the nearest approach to a botanical book which they brought out was one on the drugs and spices of India by Garcia da Orta (fl. 1530-1563), a professor from Coimbra who was physician to the Viceroy at Goa in the middle of the sixteenth century. Even this book was suppressed later by the Inquisition owing to Garcia's Jewish faith. The only plant which they are supposed to have introduced to Europe was a variety of Sweet Orange, superior to the Sweet Oranges then known in Europe, sent to Lisbon by the fourth Viceroy, Juano de Castro, about 1545. There was a persistent tradition that this same tree was alive at the end of the

seventeenth century in the gardens of Count St. Laurent in Lisbon.

In 1552 the first Catholic, as distinct from Nestorian, missionaries appeared in China, but they did not gain a real foothold until 1600 when Matthaeus Ricci received permission to live at Peking. These early missionaries were almost entirely Jesuits, most of whom were carefully chosen for their scientific knowledge. Such influence did they gain at the Court at Peking that some provinces, including Kwangtung, Kiangsu, Chekiang and even Szechuan, were almost within sight of becoming predominantly Christian.

These missionaries provided much information about Chinese economic plants, but they seem to have lacked all initiative or desire to introduce any of these plants to Europe. In fact we have to wait until about 1700 until we find a missionary who was worthy of being called a botanist. This was Georg Joseph Kamel (1661-1706), a Jesuit from Brno who was never actually in China, but lived for many years in the Philippines, where he collected plants grown by the Chinese living in those islands. A number of these herbarium specimens accompanied by drawings and notes were sent to the English botanists Ray and Petiver who published descriptions and illustrations.

It is clear from Linnaeus's *Critica botanica* and *Hortus Cliffortianus* that he named the genus *Camellia* in Kamel's honour, using his latinised name *Camellus*, but the publication of Kamel's list of Philippine plants in an English book (Ray's *Hist. Plant.*) misled Linnaeus into considering him an Englishman.

Next to arrive on the Chinese scene were the Dutch who had gained complete control of the Spice Islands by 1610. They were, however, singularly unfortunate in China chiefly owing to the influence of the Portuguese at Macao. In 1665 they even went so far as to send an embassy overland from Canton to Peking. The envoys were admitted to an audience and prostrated themselves according to strict court etiquette; but their mission was a failure and they had to leave without

obtaining the necessary permission to trade. The best they could do was to hold part of the island of Formosa for about forty years until they were expelled in 1662 by the Chinese pirate Koxinga. The Dutch were more successful in Japan.

Direct English trade with the East did not start until 1600, when a group of London merchants organised "The Governor and Company Merchants of London, trading into the East Indies." So difficult was it found to open trade with China that the Company, as it was usually called, established a factory at Hirado in Japan as a possible base from which to approach China. But this came to nothing. It was not until 1635 that the first British ship, aptly named the *London*, was first despatched to Macao from India. Actually the first direct voyage between England and China was accomplished by four ships that did not belong to the Company, but were under the command of a Captain Weddell. This was in 1637, and the venture was not a success.

Troubles at home and abroad were quite sufficient to stop any real attempt to further trade with China until the Company was given a new charter by Charles II in 1661. Even then it was dogged with misfortune, as factories were established under the protection of the last few followers of the vanquished Ming Dynasty, who controlled only the island of Formosa and a little territory on the mainland opposite the island. A factory was established at Taiwan in Formosa in 1670 and in Amoy in 1676. The former was abandoned in 1686; the latter about 1698.

Another company, known as the English Company, opened a factory at Canton in 1699 and another at Chusan in 1699. For a few years there was fierce competition between the two companies, but by 1708 they had completely combined. In 1710 the only two ports where foreign trade was carried on were the closely adjoining Canton and Macao.

That, very briefly, is a resume of the facts leading up to the permanent establishment of a factory of the Company in China. It might be imagined that with such an excellent stepping-off place a gradual infiltration of the country would

commence. Exactly the opposite was the case. It is true that in 1685 the Emperor Kang Hsi magnanimously opened by edict all Chinese ports to foreign trade, but twenty-five years later foreign trade was so hedged in by rules and regulations and such heavy "presents" were mulcted that it was hardly worth carrying on.

By the middle of the eighteenth century some of the restrictions relating to trade and foreigners were as follows:

All trade was confined to the ten to thirteen Hong merchants (i.e. those licensed to trade with foreigners).

All petitions to officials had to go through the Hong merchants and direct communication was prohibited.

The factories where foreigners lived were under the control of the Hong merchants.

Freedom of movement was restricted. Sailors were confined to certain islands, and the traders to Macao during summer. While in Canton they could only move a very short distance from their factories.

The study of the Chinese language was prohibited.

Foreigners were not to have Chinese servants other than licensed interpreters and compradores.

Foreigners were not to employ couriers to carry letters into the interior, or to ascertain prices of commodities.

This state of affairs persisted until after the so-called Opium War of 1840 between England and China. Before that, in order to try and improve conditions, and, if possible, to prevent the constantly increasing "squeeze" of the mandarins, the British Government together with the Company sent two Embassies to China, the first under Lord Macartney in 1793, the second under Lord Amherst in 1816-1817. Although they were able to travel through China, and so improved our knowledge of the country, yet they accomplished almost nothing. There were slight ameliorations for a short time after the Embassies, but the Chinese promised them everything, so as to get rid of what they considered public nuisances in the shortest

possible time. As soon as their backs were turned the old vexatious rules and bribery and corruption started again with renewed vigour.

In 1787 one of the Company's supercargoes in Canton wrote:

"The Chinese Government is proud and insolent. It looks with contempt on all foreign nations. Its ignorance of their force gives it confidence in its own strength, which by experience it knows to be superior to the bordering Hordes of Tartars with whom it is commonly engaged in War; nor do I think it looks on Embassies in any other light than acknowledgements of inferiority."

That remained true for nearly another century.

Is it any wonder that under those conditions, when the heads of our factory in Canton sent petition after petition to the mandarins to be allowed to go far enough from the factory to stretch their legs, the variety of plants discovered and sent home was extremely limited? The wonder is not that they were so limited but that so many were collected and introduced.

2

The First Hundred Years

It is generally accepted that James Cunningham (or Cuningham) was the first botanical collector in China, although undoubtedly a few plants were collected, and herbarium material sent home, some years before his day; both Petiver and Plukenet mention a number.

At this distance of time it is quite impossible to recognise more than a small proportion of plants named under the uninominal system in use before Linnaeus. Although both Petiver and Plukenet were fairly lavish in giving China as the

habitat of plants in their books, yet many of them are more than suspect, and probably did not come from China. So little was known of Asia that place-names were often used recklessly. For instance, Petiver notices the China Shunda, or Thorny Nightshade, as growing in the Chelsea Garden, and quotes Plukenet's description of 1691 in support. Shunda is a Malabar term for *Solanum*, and the plant described is almost certainly *Solanum indicum*, which is widely distributed throughout the East. But if the plant had been introduced from China, it would not have had a Malabar name attached: it is taxing our credulity a little too high to call this a Chinese plant.

There is an elusive gentleman, a Mr. Nathanael Maidstone, listed in Britten and Boulger's *Biographical Index of British and Irish Botanists* as being a native of "Barbone, Worcester. Sent pl. from China and India to Petiver and seeds to Sloane." He cannot have been of much importance, as the librarian of the Victoria Institute at Worcester has kindly searched the records for that period and has been unable to trace any one of that surname. Nor when the Sloane MS. which mention him come to be examined can there be found any proof that he visited China. Three letters of about 1720 deal with the ailments of his wife and mother, while another is a list of curiosities in his possession including a number of items from China, Ginger and Rhubarb among them. Some of the plants in the Sloane Herbarium are described as having been given to Sir Hans Sloane by Maidstone and as having been collected in China; but there is no definite proof that Maidstone himself collected them.

Very little escaped the eagle eye of Bretschneider. As he does not mention Maidstone, it is more than likely that Maidstone never visited the East. It is as well, however, to draw attention to his existence lest any one should imagine from the entry in the *Biographical Index* that he was an earlier collector than Cunningham.

Unfortunately very little is known about Cunningham. It is lucky that he went to China before trade was entirely concentrated at, and restricted to, Canton, as he was able to

botanise in areas that shortly after were closed to European intercourse for over a century.

He entered the service of the East India Company as surgeon in 1698 and was at once sent to Amoy. Returning home the following year he was elected a Fellow of the Royal Society. In 1701 he again set sail for China and reached Chusan on October 1st. It was in that interesting and charming archipelago that he made his main collections, although some plants are labelled Amoy. He must have advanced beyond the post of surgeon, as in 1703 he was sent to Pulo Condore, one of the Company's factories for the express purpose of trying to open up trade with Cochin-China. In this quest he was not successful. He is next heard of in Macassar in 1705 when the station was attacked and the English killed almost to a man. Cunningham for some reason was spared and taken to Cochin-China where he was a captive for two years. Finally in 1707 he was sent to Batavia again to try and start trade, this time with Java. In some way he must have incurred the real enmity of the Chinese, as he was again expelled at their instigation in 1708 or 1709. He embarked for England and apparently died on the voyage home, as he disappears completely from view.

His herbarium came into the possession of Sir Hans Sloane, partly through Nathanael Maidstone, as both names are occasionally found on the same sheet. In time this herbarium became part of the foundation gift of the British Museum. It is known that Cunningham sent home dried material of over 600 species.

Of his discoveries much the most important was that magnificent conifer, *Cunninghamia sinensis*. He also found an evergreen relative of the Witch Hazel, *Loropetalum sinensis*, *Acer trifidum* and, at the other extreme, two small double Chrysanthemums. A few, very few, plants were actually introduced by him to England as seeds; among them *Hibiscus Manihot* and *Rhus semialata*, both of which were raised at the Chelsea Physics Garden. Of the latter Petiver wrote in 1710: "The leaves resemble our Ash but are broader and deeper

serrated, and very soft underneath. James Cunningham brought large specimens with ripe berries from China. From these berries living plants were raised in the Chelsea Garden." Another plant growing at Chelsea in 1705 was the Chinese Tallow Tree, *Sapium sebiferum*.

Cunningham must have been an enthusiastic and skilful collector.

Shortly after Cunningham's departure from China foreign trade was entirely concentrated in Canton and Macao. So cooped up were the employees of the Company that little serious botanical collecting was possible until Lord Macartney's Embassy of 1793. Yet it is surprising how many Chinese plants are listed in Aiton's *Hortus Kewensis* of 1789. Most of them are of little interest to modern gardeners, but they are quite sufficient to show that by some means or another plants were collected beyond the immediate environs of Canton, probably by Chinese.

The following are a few of the most interesting:

Dianthus chinensis, which was in cultivation before 1713, probably introduced by the French about 1702.

Ailanthus altissima (*glandulosa*), the Tree of Heaven; introduced by D'Incarville, who will be mentioned later.

Koelreuteria paniculata, introduced about 1763 by the Earl of Coventry.

Belamcanda chinensis, grown by Philip Miller in 1759.

Camellia japonica, cultivated before 1739 by Lord Petre.

In most cases it is not known who despatched the plants or seed from China. Apparently the Company was broad-minded where plants were concerned. The captains of the Indiamen were complacent but careless until they found that money was to be made by the carriage of plants. These were packed in cases and carried on deck so that they got as much light and air as possible. Packing and carriage is described in greater detail in Chapter VIII.

One episode will show that the successful introduction of live plants was a tricky matter with a large element of luck. About 1758 an Indiaman under the command of a Captain

Hutchinson carried amongst other cargo a plant of *Cycas revoluta*, consigned to Richard Warner of Woodford in Essex. Unfortunately the vessel was attacked by the French on the voyage home. It escaped but not before a shot had cut the head of the *Cycas* clean off. Luckily the stem was not thrown overboard, and by the time England was reached the plant had produced several heads which were removed and propagated.

One English name during this period stands out in Canton as a keen plantsman, John Bradley Blake. Born in 1745 and educated at Westminster School he was sent in 1766 as a supercargo to Canton. His particular interest was in economic plants; indeed, his plan was to procure seed and plants of as many Chinese economic plants as possible and distribute them in Europe and America. He sent seed of a number to London, but much more important he was certainly the introducer of Cochin-China Rice and the Tallow Tree to Jamaica and Carolina. He died after he had been only seven years in China, otherwise there is little doubt that he would have ended as a great collector when conditions in the Canton neighbourhood became a little more settled.

Blake has been ignored by most botanical writers: even Bretschneider describes him in a few lines. What he did in such a short and very difficult time is quite remarkable. There is a volume of drawings in the British Museum carried out in Canton by a Chinese artist under his supervision. These show such botanical accuracy that Blake's supervision must have been strict and his botanical knowledge above the ordinary. It is more than a pity he died so young.

A number of other English names are to be found during this period, but none are of importance.

Collecting was done from time to time by nationals of other countries. This is shown by the number of Chinese plants introduced into cultivation in Europe. Many of these were sent home by Jesuit missionaries who were allowed much greater freedom of movement, particularly round Peking where the Court often made use of their scientific knowledge.

One of the most important was Pierre Nicholas le Chéron D'Incarville (1706-1757) whose name was commemorated in *Incarvillea* by Antoine de Jussieu in his *Genera Plantarum* of 1789. *Incarvillea Delavayi* is a popular garden plant to-day. He laboured in China for sixteen years, from 1740 to 1756, most of which was spent at Peking. He was probably the first trained botanist to collect in China, as he was a pupil of the great Bernard de Jussieu. D'Incarville collected a number of plants in the neighbourhood of Peking and a few round Macao; but what is much more important he constantly sent home seeds either to Paris or to Philip Miller at Chelsea or, by means of trading caravans journeying across Siberia, to St. Petersburg.

The most important of these introductions was certainly *Ailanthus altissima* (*glandulosa*), the Tree of Heaven. Seed of this was sent both to Philip Miller and to de Jussieu in France. Another important tree was *Thuja orientalis*, seed of which was sent to France about 1752, while he was probably the first to send home seed of *Lycium chinense*. He was also very interested, as were all missionaries, in economic plants.

It is interesting to note that D'Incarville's herbarium was lost for 140 years. When it was rediscovered by Franchet, he had no difficulty in naming all the specimens, so well were they preserved.

After many years of constant bickering between those in charge of the Company's factory at Canton and the mandarins, trade became so difficult and costly owing to the ever-increasing "squeeze" that the British government decided to send a special Embassy direct to the Emperor's Court at Peking. This was done owing to a strong belief that direct contact with the supreme authority might prove to be the solution of all Cantonese difficulties and the means of opening other ports in China to foreign trade.

To this end a big frigate and another vessel left England in 1792 with Lord George Macartney, who had been Governor of Madras, in command, Sir George Leonard Staunton as

secretary, a numerous suite, and presents worth more than £15,000 for the Emperor and his Court.

Politically the Embassy was a complete failure. Its members were treated from start to finish more like subjects of a vassal state who had come to pay tribute. One would be amazed at the very great tact displayed by every one on the mission, if one did not realise that none of the Englishmen spoke or understood one word of Chinese, except, oddly enough, Sir George Staunton's son, a boy of thirteen called George Thomas, who was afterwards to become the famous sinologue. When the aged Emperor Kien Lung ultimately agreed to receive the Embassy and held a reception in their honour, he asked if any of the Englishmen spoke Chinese and was vastly intrigued when young Staunton answered him in Chinese.

While the political and economic result was unfortunate, from the scientific side the Embassy was far more successful. Luckily when it reached Peking, the Imperial Court was in residence at Jehol to the north, and there the mission went for its audience. It was thus able to see the Great Wall and botanise in the hills. Sir George Staunton was an enthusiastic collector, and Lord Macartney was sympathetic if not quite so ardent. In addition two gardeners sailed with them, one paid out of public funds, the other probably by Staunton himself. One was called John Haxton; the name of the other is unknown.

The Embassy came direct to Tientsin by sea, but the frigate in which they had travelled sailed back to Canton and waited for their return there. This necessitated the long journey overland from Peking to Canton, most of which was completed by boat down canal and river, but was sufficiently slow to allow time for botanising and a fairly complete survey to be made of the country traversed. This was well described by Staunton in *An Authentic Account of an Embassy from the King of Great Britain to the Emperor of China* in two quarto volumes and a folio volume of maps and plates.

It is not known just how many plants the mission col-

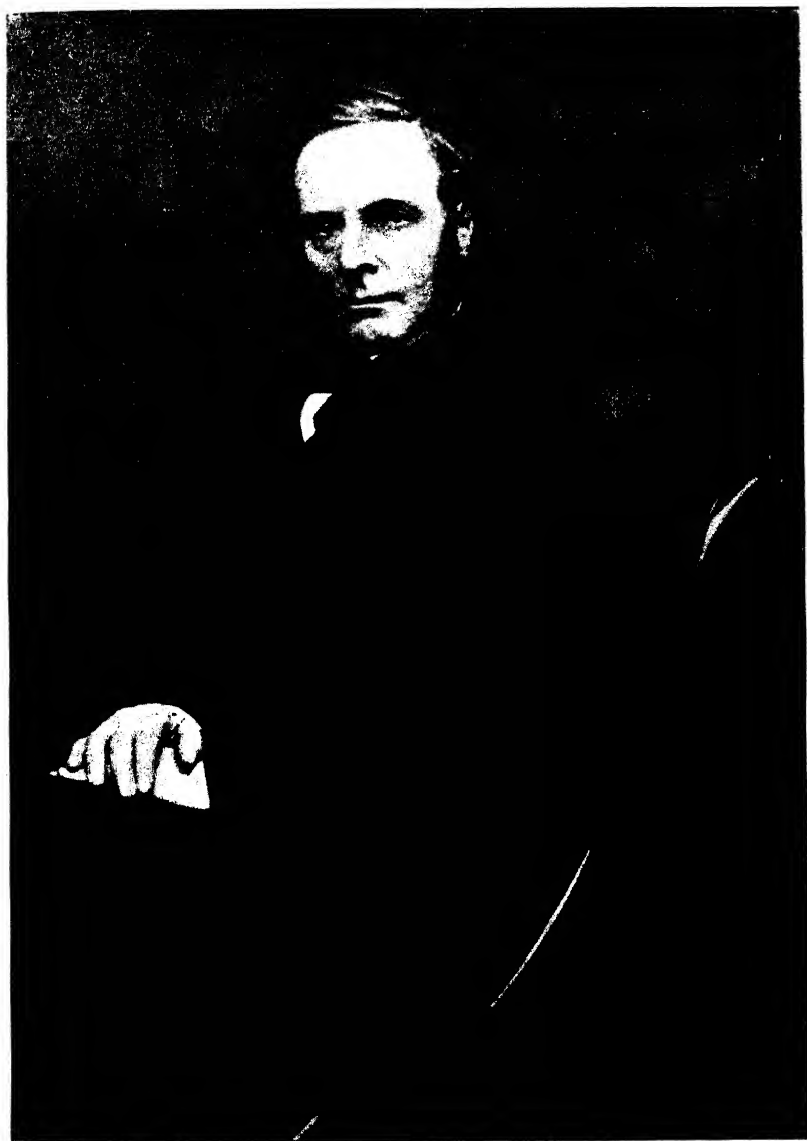
lected, as the dried material seems to have been scattered not only in this country but also through several continental herbaria. The lists given in Staunton's book are incomplete and poorly worked out. Hurried as the mission was through the country with no waiting periods of more than a few days in any one place, it naturally had little opportunity to introduce many new plants into Europe. Also what few plants were introduced were, for the most part, on the tender side. The most important were *Cupressus funebris*, the Weeping Cypress, *Rosa bracteata*, *Macleaya* (*Bocconia*) *cordata* and *Polygonum chinense*.

3

The Rise of the Professional Collector

Towards the close of the century there was a distinct quickening in the British Isles of interest in Chinese plants. By the beginning of the nineteenth century the plant enthusiast had been born, a type that has existed in one form or another to the present day. At the start the main interest lay in what might be called Chinese florist flowers, such as forms of *Chrysanthemum*, *Paeonia suffruticosa* (*Moutan*), *Camellia* and *Azalea indica*, all of which had been popular in China for centuries and were grown in very large quantities in and about Canton and Macao.

It is possible that the keen gardener of the early nineteenth century would not have been so interested in hardy herbaceous plants and shrubs, even if they had been obtainable. That period of horticulture was extremely hidebound with very definite lines of demarcation between what should be grown and what should not. Probably the principal interest in new plants lay in those suitable for the stove and the greenhouse. At this time the cultivation of hothouse plants reached heights that have never been excelled. Thus the knowledge that there were dozens of varieties of *Camellia* and *Chrysanthemum* and



V—ROBERT FORTUNE



VI—*RHODODENDRON FORTUNEI* GROWING ON LIMESTONE

Azalea waiting to be introduced from China raised an extraordinary enthusiasm among wealthy gardeners.

It made very little difference that enthusiasm should be stirred when Europeans were even more restricted in their movements and dealings with the Chinese after the failure of the Macartney Embassy. The captains of the Indiamen became personally acquainted with more Chinese; the former were well paid for bringing plants home and in turn were able to offer good prices for suitable plants in Canton. The consequence is that one hears of private gardeners introducing new varieties brought home by Captain Connor of the *Carnatic* or Captain Wellbank of the *Cuffnells*, and so on.

Bretschneider with his usual painstaking thoroughness carefully lists all new names of Chinese plants given in the second edition of Aiton's *Hortus Kewensis* (1810-1813) as being cultivated at Kew. They total about ninety, almost all introduced between 1786 and 1808 by private individuals and not by the Royal Gardens.

Much the greatest gardener of the day was Sir Joseph Banks (1743-1820). This benevolent scientific despot was very wealthy. Moreover, he was enthusiastic about introducing new plants from all over the world. He was no armchair scientist, as he accompanied Cook on his three years' voyage of 1768 to observe the Transit of Venus in the Pacific. He also visited Iceland in 1772. After retiring from active participation in exploration he continued to collect herbarium material in vast quantities at Sloane Square as well as living plants in his garden at Spring Grove, Isleworth, only a short distance from Kew. He and Jonas Dryander, his Swedish librarian and herbarium-keeper, were exceptional in their day for definitely preferring species to garden varieties. *Hydrangea macrophylla* (*hortensis*), *Paeonia suffruticosa* (*Moutan*), *Magnolia conspicua*, *Iris japonica*, *Ligustrum lucidum* and *Lilium tigrinum* make half a dozen plants which any one would have been proud to introduce.

If Sir Joseph Banks was world-famous, Sir Abraham Hume (1749-1838) and his gardener, James Mean, of Wormleybury

in Hertfordshire were certainly among the best cultivators of their time. Contemporary horticultural and botanical journals are constantly mentioning their successes. They grew a gigantic plant of *Paeonia suffruticosa* var. *papaveracea*. In 1826 it was 40 feet in circumference, 7 feet high, and produced 660 flower buds of which 130 were removed to allow those remaining to grow to a larger size. They also had a famous plant of *Magnolia conspicua*. This was only planted in 1801, twelve years after its introduction by Sir Joseph Banks. In 1826 it was over 20 feet high and carried more than 900 flowers. Sir Abraham Hume imported a number of greenhouse plants and varieties of *Chrysanthemum* direct from China.

There were many others keenly interested. Charles Francis Greville, after whom *Grevillea* is named, introduced *Bignonia grandiflora* and *Lilium concolor*, besides several varieties of *Camellia japonica*. Another great collector of novelties was Thomas Evans of Stepney who "devoted almost his whole income to the acquirement of new and rare plants, which he generously distributed among other collectors." Among other plants he introduced *Rosa multiflora*. Equally keen were two brothers Gilbert and John Slater, both directors of the East India Company. The latter, according to the *Botanical Repository* of 1798, "produced a catalogue to be printed of all the described Chinese plants in that language, with the descriptions translated, and by various hands transmitted it to that country."

This was remarkable energy, but unfortunately almost useless, as early Chinese botanical works, unless they deal with medical herbs, are extremely mediocre in quality.

Mention has been made before of Haxton and another professional gardener who accompanied Macartney's Embassy to the Chinese Court. So little attention is drawn to them in the various accounts that it is doubtful if they were of great value to the mission. In any case their presence was quite incidental: they were never allowed to stray far from the routes laid down by the Chinese government. It is hardly fair, therefore, to call them botanical collectors, although they

were certainly the first professional gardeners of British nationality to travel in China.

The first botanical collector to reside in China for more than a few weeks was William Kerr (d. 1814), after whom *Kerria japonica* is named. He was sent to Canton by the Royal Gardens at Kew in 1803. He stayed there, with side excursions to Java and the Philippines, until he was appointed to the Botanic Gardens at Colombo in 1812. We do not hear of him sending plants to any private collector except Sir Joseph Banks, if he can be called a private collector. It is difficult to understand Kerr's position, as it seems unlikely that the Kew authorities would pay him a salary of £100 per annum and reasonable expenses for nine years to be cooped up in the near neighbourhood of Canton and Macao.

John Livingstone, the chief surgeon to the Company in China, obviously did not like Kerr. He complained about his behaviour and wrote home that after a year or two he had fallen into bad company. Later he wrote that Kerr's lack of success was entirely owing to the poor salary paid him by Kew.

Yet Kerr was by no means unsuccessful, when it is remembered that almost all the plants during this period had to be bought at one or other of the nursery gardens at Canton, usually at the largest which was called the Faté Gardens. He introduced *Kerria japonica* fl. pleno, *Nandina domestica*, *Lonicera flexuosa*, *Rosa Banksiae* and *Nymphaea pygmaea*. He also sent the bulbs of *Lilium tigrinum* to Sir Joseph Banks along with so-called *Lilium japonicum*, which was really *L. Brownii* var. *colchesteri*, the commonest Trumpet Lily in south China. *Lilium tigrinum* made a hit. William Townsend Aiton, then Director at Kew, at once recognised its value. Between its introduction in 1804 and 1812 he propagated and distributed with his usual generosity over 10,000 bulbs. Indeed, the speed with which it was distributed among gardens large and small can only be equalled by Wilson's *Lilium regale*.

Another plant that excited great interest was the Tree Peony. Bretschneider states that it was first introduced by

Sir Joseph Banks in 1787; Joseph Sabine, the secretary of the Horticultural Society, placed its introduction two years later. In any case efforts were at once made to import it in greater variety and in quantity.

There were difficulties. The Tree Peony was not a native of Canton and district, but was brought there in the form of dormant roots from nurseries somewhere on the Yangtze. These imports arrived when the European shipping season was over and all Europeans had been relegated to Macao. The consequence was that Europe had to be satisfied with plants that had been forced into flower. As the Chinese made no efforts to retain plants for more than one year, and said that the Tree Peony would not live in Canton more than a year or two, roots exported to England were half starved and only fit for the rubbish heap. It is not surprising that few survived the journey. In thirty-seven years only four varieties were introduced.

In 1815 the British Government decided to send a further Embassy to China to try and succeed where Lord Macartney had failed. This Embassy was under the command of Lord Amherst with Sir George Thomas Staunton, son of Sir George Leonard Staunton, as second in command. Dr. Clarke Abel was appointed physician. He was also a good botanist, and, at Sir Joseph Banks' suggestion, he was appointed naturalist. He was assisted by his brother-in-law, a Mr. Poole, and by Hooper, one of the Kew gardeners. In Abel's narrative of the journey it is clearly stated that Hooper's job was to look after "a plant cabin, for the preservation of living specimens."

This Embassy set out with great hopes of success. It was much better equipped than that of Lord Macartney. Staunton knew Chinese, while the interpreters Morrison and Davis were British as well as being excellent Chinese scholars. But with all its advantages it was even less successful. The Ambassador declined to prostrate himself before the Emperor, and owing to indisposition neglected to attend on the day of his arrival. The Embassy was, therefore, dismissed without having

reached the throne. They returned to Canton by the Grand Canal from Tientsin to the Yangtze, then to Nanking through the Poyang Lakes to Nanchang. From there to Canton they followed Macartney's route.

Unfortunately Abel was not in robust health and was unable to do much collecting himself. His assistants worked hard and managed to collect seed of more than 300 plants. This is the first record that I can trace of seed having been collected in bulk in China. Here again misfortune dogged them. The entire collection of seed and herbarium material, including two subsidiary collections given to them for safe keeping by John Livingstone of Canton and Lieutenant Maughn, were lost when the ship in which they were travelling home, H.M.S. *Alceste*, was wrecked on an uncharted coral reef in the Banca Straits. Luckily Abel had given such duplicates as he had to Sir George Staunton and from them we are able to glean something of what they found, a rich harvest, including *Prunus Mume* and *Abelia chinensis*, the latter called after Abel.

Gardeners at home and collectors in China were extremely fortunate in finding a number of enthusiasts resident in Macao and Canton. But for them the introduction of new plants from China would have languished for many years.

The earliest of this band to reach China was Thomas Beale. He and his brother Daniel were well-known eastern merchants, first under the name of Cox and Beale of Canton and then later as Beale and Magnac of Calcutta. Daniel founded the business in Canton in 1787, and in 1792 was joined by his brother Thomas. The latter lived in Macao for fifty years and had one of the finest gardens and aviaries in China. He was the first man to send the Reeves Pheasant to England. In his garden there were over 2500 pots, the usual Chinese method of cultivating almost all plants. After the first Chinese war when Hong Kong was annexed, the bulk of his collections (he had just died a year or two before) were taken to form the nucleus of Messrs. Dent's famous garden at Green Bank.

Beale rarely left Macao and did not carry on a large correspondence with English gardeners, but he was behind the scenes in the introduction of many new plants to Europe, leaving the actual details to Livingstone or Reeves.

John Livingstone, as chief surgeon to the Company in China, had had a strict scientific education. He reached China about 1793 and was always keen on gardening, but rather from the scientific side than from growing or introducing new plants. In fact, in one of his letters to the Horticultural Society, of which he became a corresponding member in 1817, he writes almost disparagingly of Chinese florist flowers: "In these (nursery) gardens may be seen all the plants for which a demand exists among the Chinese themselves, but they will be found to consist of a very small variety comprehending only showy or odoriferous plants, shrubs and trees, and such fruit trees as are commonly cultivated in the gardens." He was much more interested in vegetables and wrote an interesting paper for the Horticultural Society of London on Chinese Esculent Vegetables, which is printed in the Society's *Transactions*, vol. 5, 49-56 (1821).

Livingstone's importance to horticulture lies in the experiments he made in prolonging the viability of seeds so that they might survive the journey home, and in the despatch and treatment throughout the voyage of live plants. (See Chapter VIII.)

The third and greatest of this band of gardeners was John Reeves. Throughout his long life he wielded an extraordinary influence on horticulture, as great in the British Isles as in Canton and Macao. He was born in 1774 and educated at Christ's Hospital. By great good luck he entered the counting house of a tea broker where he showed such aptitude for tea inspection that in 1808 he was appointed inspector in England to the East India Company, a post of great importance. In 1812 he was sent to China first as assistant inspector. Later he was promoted chief inspector of tea at Canton, one of the most important positions in the company. With the exception of two holidays in England he lived in Macao, and Canton

during the tea season, until he retired in 1831. He died in 1856.

The moment he arrived in China he began to take an interest in that country's plants and gardens. Until Sir Joseph Banks died in 1820 Reeves was in constant communication with him as well as with Sabine and Lindley of the Horticultural Society.

In the past it has been the habit of most writers on plant introductions from China to focus the interest on Reeves to the detriment of all that went before him. He has been called one of the Nestors of Horticulture; it has been said that little was known of Chinese plants until he arrived at Canton; it has been stated that hardly a single good garden plant had been introduced before his day.

Exaggeration: it shows the Chinese scene in a false perspective. Many of the best florist flowers of China were known before his day; quite a number had been introduced. But the importation was haphazard. Little attempt had been made to win the good-will of the captains of the Indiamen on whom so much of the ultimate success or failure of the transportation depended. Science in horticulture had not been asked to play its part. There had been no driving force behind those who sent home plants to urge them on to send over and over again in case of failure until success was at last attained.

All this Reeves supplied, an even greater credit to his prowess than if he had merely been the lucky discoverer of good florist forms. Reeves was exceedingly methodical. Not a plant left China until it had been established for several weeks in the pot in which it was to travel, and established either in his own garden or in that of Beale or someone else whom he trusted. Being in a position of such importance, he was able to see that his orders about the voyage home were carried out; but he did this with such tact that, far from riding high-handed over the captains of the ships, he completely won them over. From considering all plants a nuisance they became enthusiastic in trying to get the plants despatched under their care safely home with the minimum of loss.

Reeves was in close contact with Livingstone and utilised to the full the latter's advanced ideas about transport. Years before the Wardian case in its final form came into being, plants were sent in almost every ship in cases that resembled little portable greenhouses.

Above all Reeves would never admit of failure. If plants died on the voyage, or the cases through stress of fierce storms had to be thrown overboard when rounding the Cape, then as soon as word reached China another consignment was sent at the earliest opportunity.

This enthusiastic labour was accomplished with so little fuss and advertisement that there is no doubt that many of the plants which are listed in the various horticultural periodicals of the time as having been introduced by Captain this and Captain that were really procured in China by John Reeves, and sent home by him without having his name even attached to the case.

In addition to the collection of living material he realised the importance of correct identification. For a number of years he employed several Chinese artists, who lived in his house and worked under his personal supervision. One of their first tasks was to paint life-size coloured figures of 340 different species and varieties of fish that were sent to the Canton markets. Later they turned their attention to flowers. Coloured drawings of excellent quality were produced by the hundred. The first, and probably original, collection was sent by Reeves during his lifetime to the Horticultural Society; a second, consisting of 654 Chinese drawings, was presented by his daughter to the British Museum in 1877.

Those that were acquired by the Horticultural Society were sold with the rest of the fine library when the Society came to grief in 1859 and disappeared completely for many years. By the greatest good luck they have reappeared and are again in the Society's possession. Among the many fine books bequeathed to the Lindley Library of the Royal Horticultural Society by the late Reginald Cory were five volumes of coloured drawings which he had purchased from a bookseller

in 1908 without knowing anything of their history. The watermark of the paper, the green leather binding, the handwriting (undoubtedly that of John Lindley, for many years secretary of the Horticultural Society) and a little stamp "H.S." on some of the drawings immediately caught the attention of the Society's librarian when they were received in 1936, and led to their recognition as the long lost and forgotten Reeves collection. Some unfortunately are damp-stained, but their value to horticulture, their beauty and interest are unimpaired. One of the most interesting from the point of view of modern horticulture is the painting of *Primula sinensis* reproduced in this volume. When this was sent home in 1819, it created great excitement, and a request was at once sent to Mr. Reeves to procure if possible both plants and seeds. This he did with his usual enthusiasm, but unfortunately the plants died and the seeds did not germinate. In 1821 a plant was given by Captain Rawes, one of the Company's captains, to a relative, Thomas Palmer, of Bromley. As this same Captain Rawes was the first to introduce *Camellia reticulata*, it is probable that Reeves had something to do with it. It is difficult to imagine that he would let such a magnificent plant miss his eagle eye.

One of the romances of plant introduction was that of *Wistaria sinensis*. Apparently it was sufficiently rare in Canton to be considered a novelty by the Chinese. Ultimately it was discovered in the gardens of Consequa, one of the greatest of the Hong merchants. It is not known who arranged for its despatch to England, possibly Reeves, but it arrived in May, 1816, brought home by a Captain Robert Wellbank and was given by him to C. H. Turner of Rooks Nest in Surrey. Only a few days later another plant arrived, this time under the care of Captain Rawes who gave it to T. C. Palmer. The first plant grew well and was speedily propagated by the nurseryman Loddiges.

Two years later Reeves sent a plant to the Horticultural Society and this was planted in their garden at Chiswick where for many years it was one of the floral wonders of the

world. In 1839 it was 180 feet long, covered 1800 square feet of wall and produced 675,000 flowers. It was certainly the finest specimen in Europe.

Almost all living plants introduced by Reeves came from the immediate neighbourhood of Canton and Macao. His herbarium was not so important, and was also limited to those two districts with the exception of a few plants collected in the Tea districts of Fukien, probably by a Chinese collector. If any proof is required of the irksome and severe restrictions placed on the movements of Europeans, and of Chinese in their employ, outside the precincts of Canton and Macao, this limitation of Reeves' collections should provide it. Here was one of the most important Englishmen in the Far East, who had lived there for many years and knew influential Chinamen, and who purchased millions of pounds of tea during his period of service; yet even he, with all his influence, was kept within a radius of a few miles. It is surprising how much he was able to accomplish, restricted as he was.

On Reeves' retirement to England in 1831 he became one of the powers in the Horticultural Society. He was mainly instrumental in sending Robert Fortune to China.

Reeves had a son, John Russell Reeves, who was also an employee of the East India Company and also sent home plants. In some cases, such as the magnificent *Dendrobium nobile*, it is difficult to tell whether father or son was the introducer, but it was probably the former.

About this time there arose a fresh driving force in the introduction of exotics into British gardens, the Horticultural Society of London, which in 1860 became the Royal Horticultural Society. The membership of the omnipotent Royal Horticultural Society to-day consists mostly of those who are satisfied if the Council supply them throughout the year with a sufficient number of flower shows to make their subscription worth while. When its prototype, the Horticultural Society, was founded in 1804, its objects were scientific and educational rather than spectacular. The founders were Sir Joseph Banks, William T. Aiton, Director of Kew Gardens,

John Wedgwood, the potter, T. A. Knight and William Forsyth. The first secretary was R. A. Salisbury, followed a little later by Joseph Sabine with John Lindley as his assistant. Many of the members were professional gardeners, and the amateurs were exceptionally keen. With this enthusiasm and a certain amount of money behind them it was only a matter of time before they decided to send out plant collectors to various parts of the globe. This was a year or two before the famous garden at Chiswick was founded in 1822.

It was the Society who first got in touch with Reeves. Lindley wrote in 1821, "One of the main objects which occupy the Horticultural Society is the introduction of ornamental plants to the gardens of the country and the free distribution of them when procured. As it is difficult to form a very correct idea of the beauty of the plants from the appearance they assume when dried, in which state only, a great proportion of tropical vegetables is known to residents in Europe, it was determined by the Society that a person should be employed in making drawings of plants in the country where they grew. For several reasons China was selected for a beginning, and particularly as being the residence of John Reeves, Esq., a correspondent and very active member of the Society, under whose immediate superintendence the draughtsman could be placed. By the direction of this gentleman, a considerable number of drawings have already been sent to England and many of the plants they represented introduced." These are the Reeves drawings already mentioned.

It is easy to see why their eyes were turned to China. Transport was improving; keen friends were on the spot; enough good garden plants had been introduced to whet their appetites for more. What is not quite so easy to see is why the Society went to all the trouble and expense of sending one, let alone two, collectors. Reeves, Beale and Livingstone lived either at Macao or Canton and were anxious to do all they could to help. The East India Company was sympathetic and put nothing in the way of the introduction of

plants. The captains and officers of the Indiamen were becoming more and more skilful at transporting the plants home safely.

Above all China had not changed. It was possible to go a few miles outside Canton and Macao, but these were still the only ports open to Europeans and travel in the interior was just as strictly forbidden as formerly.

The first of these two collectors was John Potts, gardener to the Horticultural Society, who made a round trip to China and Bengal on the Indiaman, *General Kyd*, leaving in 1821 and returning home in August, 1822. Lindley spoke highly of his prowess as a collector, but the importance of the plants collected does not seem very striking. Probably the most important portion, forty varieties of *Chrysanthemums*, was lost on the voyage home. He did introduce several varieties of *Camellia*, *Callicarpa rubella* and *C. longifolia*, *Ardisia punctata* and several other greenhouse plants, but nothing that could not have been sent home by Reeves or Beale. Much the important thing that Potts accomplished was to bring back with him a great quantity of seed of *Primula sinensis*. It is probably from this particular introduction that our present strains of this popular flower have sprung.

The second collector was John Damper Parks. He also made the round trip, leaving in 1823 and returning in May, 1824, on the *Lowther Castle*. Although from our point of view Parks's trip was equally lacking in what we should call first-class novelties, yet he was more forthcoming. Both Potts and Parks left journals, but that of Potts was a dull affair except for a eulogy on the kindness of Dr. Livingstone and Mr. Beale who had sent his Chinese gardener to the hills to collect plants where no Europeans were allowed.

That of Parks, on the other hand, is much more informative. He speaks very highly of Reeves. "You could not have placed me under a better person than Mr. Reeves for he has shown me every attention. Indeed I may say that I have received more favours as a stranger from Mr. Reeves than I ever did from any gentleman in my life." Parks also noticed

Beale's garden and the great number and variety of plants collected therein.

As was usual in those days, Parks was most interested in the favourite Chinese florist flowers, Camellias, Chrysanthemums, Azaleas. Gardeners at home had not yet had their surfeit of them. So much attention was paid to them in China that he made a special note in his journal when "Mr. Reeves proposed to send a case of wild plants of the hardiest kind."

Apart from thirty varieties of Chrysanthemums which arrived home safely, Parks introduced several more plants of *Camellia reticulata*, a valuable consignment, and four other varieties of Camellia, *Coelogyne fimbriata*, and the yellow form of the Banksian Rose, another valuable introduction. He also brought home the first Aspidistra to be seen in England, *A. punctata*; not the universal window plant, *A. elatior*, which only reached England from Japan in 1835. Most of his journal is taken up with entries about potting and packing with occasional trips in the immediate environs of the city, and "Sabbath to Church" every seventh day. This constant reference to potting and packing over a period of several months shows that the lessons of Livingstone and Reeves were seriously taken to heart. It is quite obvious that the moment a plant arrived in Reeves' garden for shipment, it was removed from its original pot and at once repotted in a size of pot and in a compost suitable for the long sea journey.

4

The Chrysanthemum

As the florist's Chrysanthemum (*Chrysanthemum morifolium*, syn. *C. sinense*, *C. hortorum*) is certainly the most important plant introduced from Eastern Asia, I feel the historical sequence should stop for a moment while its introduction is discussed. Like so many of the *Compositae* the genus Chrysan-

themum has always been a muddled group. This is proved by the *Index Kewensis* listing no less than thirty-six genera to which various species of *Chrysanthemum* have at one time or another been assigned; and no cultivated member of the group has a more obscure early history than the florist's *Chrysanthemum*.

Botanists have identified first one, then another wild-growing *Chrysanthemum* as the ancestor from which all the garden forms have sprung. It is now clear that these cannot be regarded as simple derivatives of one species, but must be accepted as a complex garden group apparently derived from several species with its exact origin shrouded from ken by the passing of time.

The foundation of this group may be *C. indicum*, a mis-named species, as it does not occur in India, although Forrest found it in Yunnan not far from the Burmese frontier. It has small yellow flowers and is widespread in China and south Japan. But evidently other species—*C. japonense*, *C. lavenduli folium* (*boreale*), *C. Makinoi*, *C. nakdongense* (*erubescens* of Stapf but not of gardens; the *erubescens* of gardens is *rubellum*), *C. satsumense* (*ornatum*) and *C. vestitum*, according to some authorities, have contributed to its immense range of variation.

Cultivated *Chrysanthemums*, probably already modified by human care, were introduced from China into Japan in the eighth century A.D., so a Japanese authority, Teizo Niwa, states, and they have ever since been the subject of breeding and selection. The varieties now available exceed 5000. Is it surprising that most of these bear so little resemblance to any one wild species and that their origin should be so uncertain?

A curious fact about the florist's *Chrysanthemum* is that it was in cultivation in Holland about 1688, not in one variety alone but in six, with reddish, white, purple, yellowish, pink and purple-red flowers of great beauty. It was then lost to European gardens for almost exactly a century. The Dutch plants are mentioned by Jacob Breyn of Danzig, a most com-

petent observer, who described them in his *Prodromus secundus* as "*Matricaria Japonica maxima, flore roseo, sive suaverubente, pleno elegantissimo.*"

It is odd, however, that Breyn is the only one of his contemporaries to mention a flower that has improved the colour of the autumn garden more than any other. It is also a little peculiar that a plant of such inherently easy cultivation should have been allowed to die out by admittedly good gardeners like the Dutch.

Shortly afterwards Cunningham collected dried material of two small double Chrysanthemums in Chusan, very similar to those introduced a century and a half later by Robert Fortune, which were to become the parents of our Pompoms.

The next mention of the Chrysanthemum is a curious business, and a little complicated. By Sir Hans Sloane's deed of conveyance to the Apothecaries Company of the Chelsea Physics Garden in 1722, the Apothecaries were bound to hand over to the Royal Society fifty dried specimens of distinct plants from the garden annually, until 2000 had been delivered. This went on until 1774, four years after the death of the great Philip Miller. In 1764 among the annual gift of fifty specimens was one labelled *Matricaria Indica*. The specimen exactly corresponded to one of the early forms of the Chinese Chrysanthemum. Yet Philip Miller in his *Gardener's Dictionary* described a totally different plant. He stated that it is produced in large quantities naturally in India, that he received it from Nimpu (probably Ningpo in China), that it is propagated by seeds sown on hot beds: altogether an amazing collection of mis-statements. That plant also seemed to have had a fleeting existence, as in this connection it is never heard of again.

In 1789 a M. Blancard, a merchant of Marseilles, imported three varieties from China, a white, a violet and a purplish-crimson. The first two died: the third thrived, increased readily, and soon became popular in the south of France. To this plant "*fleurs purpurines*" a French botanist, Ramatuelle,

in 1792 gave the name of *Anthemis sgrandiflora* or *Chrysanthemum morifolium*, which is now used as a scientific name for the whole of florists' Chrysanthemums. From France it came to London and a sort appeared called the Changeable White with mingled white and crimson florets.

Between 1798 and 1808 eight new varieties were introduced direct to England, seven of them by Sir Abraham Hume of Wormleybury.

During that period the varieties were called after their appearance, Rose, Buff, Golden Yellow, Quilled Yellow, Sulphur Yellow, Spanish Brown, Quilled White and Large Lilac. Those were the names of the first eight varieties to be grown in 1808. The Tasselled White and the Superb White appeared in 1816 and 1817.

By this time several nurserymen recognised the importance of this flower; James Colvill of King's Road, Chelsea, who first flowered the old purplish-crimson variety in England, Lee and Kennedy of Hammersmith, and Barr and Brookes of Newington Green were all searching for new varieties. As mentioned before, Barr and Brookes had their own collector, Joseph Poole, at Canton.

The man, however, who probably did more than any one else to rouse enthusiasm was Joseph Sabine (1770-1837), Secretary of the Horticultural Society from 1810 to 1830. On February 20th, 1821, he read to the members the first paper devoted to the Chrysanthemum. He began: "The Chrysanthemum, of which I now propose to give descriptions, are natives of China or Japan, and with the single exception of the Purple, are very recent introductions. They contribute so much to the beauty of our gardens in a fine autumn, and of our conservatories in the months of November and December, when scarcely any other plants are in blossom, that they are peculiarly deserving the attention of the ornamental gardener. In the autumn of last year [1820] twelve varieties [all that were then known in this country], whose flowers and habits have been well ascertained, were cultivated in the



VII—GIGANTIC SCREES AT 16,000 FEET MARK THE LIMIT OF VEGETATION. THIS CONSISTS ENTIRELY OF MORaine AND CUSHION PLANTS ABLE TO WITHSTAND THE WEIGHT OF SNOW AND CUTTING WINDS



garden of the Horticultural Society." (*Transact. Hort. Soc.*, 4, 326, 1821.)

At the end of his talk he remarked on the great number of varieties existing in China and how the Society possessed forty original drawings made in China to show how variable they were. "All those varieties which may be considered deserving of notice, and other new ones yet unknown to us, we hope progressively to obtain." It was certainly owing to Sabine's enthusiasm that Potts and Parks were sent to China, probably with more than a gentle hint to pick up as many varieties of *Chrysanthemum* as possible. Parks responded nobly and sent home thirty. Potts was less lucky; he collected forty, but some accident happened on the voyage home and they never reached England. Sabine's studies led him to conclude that these *Chrysanthemums* formed a group specifically distinct from the *Chrysanthemum indicum* of Linnaeus, and in 1823 he christened this *C. sinense*.

So keen was the hunt and so active were Reeves and other friends in Canton, in addition to Potts and Parks, that Sabine was able to describe no fewer than sixty-eight varieties between 1821 and 1826. By the latter date it would appear that most of the superior varieties growing in and around Canton and Macao had been introduced. There is a distinct lull in importations, while Salter of Hammersmith and others were already hard at work on improvements by selection and crossing.

Even the opening of further treaty ports after the First Chinese War did not produce further untapped sources of supply. Certainly Robert Fortune and others commented on the fact that at Shanghai far better *Chrysanthemums* could be grown than at Canton owing to a more suitable climate. "Sometimes I found them trained in the form of animals, such as horses and deer, and at other times they were made to resemble the pagodas so common in the country. Whether they were trained into these fanciful forms, or merely grown as simple bushes, they were always in high health, full of fresh green leaves, and never failed to bloom most profusely

P.H.C.

E

in the autumn and winter." Nevertheless Fortune went on to remark that the progeny was more numerous in Europe than in China itself, and that some of those raised by Salter, who by 1852 had gone to live in France, would be much admired even by a Chinese florist.

As mentioned before, Fortune had in 1846 paved the way to a new race, the Pompoms, by introducing the Chusan Daisy and another small variety which he called the Chinese Minimum.

That completes the tale so far as China is concerned. From that time on Europe could produce more and better varieties.

5

An Unimportant Interval

By 1826 the importation of Chinese florist flowers was almost over. When reporting the success of David Douglas in his expedition to British Columbia the secretary of the Horticultural Society wrote, "No further Expedition is at present contemplated by the Society, its extensive correspondence with every accessible country now rendering such a means of procuring Horticultural novelties less important than it has been heretofore."

This was undoubtedly written with one eye on China. Collectors, both resident and visiting, had accomplished all that was possible in the minute portion of the country open to their search. Not that fashions had changed. Chrysanthemums, Tree Peonies, Camellias and Azaleas were in the height of fashion with a long life of popularity still before them. But almost all of the better varieties raised in China had been introduced, and raisers in England with their more advanced knowledge and excellent accommodation were already raising better plants than the old Chinese forms and hybrids. By 1834 Sweet was praising Lord Mountnorris for new varieties of *Paeonia suffruticosa* (*Moutan*) as being far superior to the imported article; and apparently this praise was more than justified.

The same improvement was taking place with the Camellia. This was due to a great extent to a nurseryman, Alfred Chandler of Vauxhall, whose name is still remembered in that excellent variety *Camellia japonica Chandleri elegans*. From 1819 onwards he produced many new varieties, mostly of his own raising. These he illustrated in such volumes as the *Camellia Britannica* (1825), with text by E. B. Buckingham and *Illustrations and Descriptions of Camellias cultivated in England* (1831), with text by W. B. Booth.

The real popularity of the Azalea came a little later. This was partly owing to the great difficulty experienced in their transport caused by their extreme susceptibility to salt water and spray. Time and again consignments of Azaleas were shipped only to die on the voyage home. Indeed, Parks, who obviously used his brains, made the serious suggestion that there would be a much greater chance of Azaleas surviving, if they were sent as cuttings under bell glasses. It is not known if this was actually done or not; but the invention and extensive use of the Wardian case lessened the damage from salt water. By Fortune's day the importation of Azaleas was comparatively simple.

The early history of *Azalea indica* (*Rhododendron Simsii*) and its varieties is obscure. Much was written about it in the middle of the century. The plant was named *Azalea indica* by Linnaeus, and of course is mis-named. It is a Chinese plant, and is not found wild in India except on the Burmese-Chinese border.

Although it had been known for years, it appears that its introduction in 1808 by Captain Wellbank on the East India-man, *Cuffnells*, was the first to reach England, if not to Europe. The next plants to be introduced were probably as late as 1832 when Joseph Knight, the nurseryman, bought two plants, a variegated form and a brick-red variety, from a Mr. M'Killigan. The first double flowered with William Wells, the nurseryman, in 1842. It was in the '40's that the difficulties of transport began to be overcome.

The exploitation of the Azalea in Europe, when it did arrive in quantity, for some reason was more or less ignored by English nurserymen. It became a speciality of the Belgians and the Dutch.

With the Royal Gardens at Kew and the Horticultural Society quiescent there was a period from about 1825, after Parks had left China until after the First Chinese War of 1840, when little of importance was collected and introduced. Various expeditions touched at Macao or Canton, but they were still handicapped by strict control of their movements

while on shore. They did little to advance our knowledge of the mainland of China.

The most famous of these was that of Captain Beechey on H.M.S. *Blossom* which set out to explore Behring's Straits and the north-west coast of arctic America. They visited Macao from April 10th to April 30th, 1827, but did no collecting of importance. Later they went on to the Loochoo Islands and the Bonin Islands and were the first Europeans to collect there. One of the botanists on the *Blossom*, George Tradescant Lay, returned to China and ultimately became British Consul at Canton and a well-known sinologist.

A number of residents are mentioned from time to time. Almost all botanised in the islands near Macao and in the hills close to Macao and Canton. They seemed to limit their collections to herbarium material. Among these residents were the Rev. G. H. Vachell, who was chaplain to the Factory, and Charles Millett, a correspondent of W. J. Hooker.

Several other nations sent expeditions to circumnavigate the globe during this period. In due course they all turned up at Macao, spent a few days botanising in the neighbourhood, returned to Europe and wrote ponderous botanical tomes, including their Macao plants. Thus the flora of this neighbourhood in course of time took on an entirely fictitious importance. Among these expeditions were those of the German Franz T. J. Meyen, after whom the lovely *Clematis Meyeniana* is named, and the Frenchman Charles Gaudichaud Beaupré.

Much more important was the exploration of Mongolia and the northern Chinese provinces by the Russians. One of the most famous of these was Dr. Alexander von Bunge. The Russians with an actual and very long frontier with the Chinese were in a more privileged position. Among other points of contact the Russians were allowed to keep what was called an Ecclesiastical Mission at Peking. To these missions were attached two or three scientists. Bunge, while still a very young man, made his name by travels in the Altai Mountains. He was therefore very suitable for the post of

botanist to the eleventh mission that reached Peking in 1830. He remained there for more than a year and was able to botanise in the Western Mountains and in Inner Mongolia near Kalgan. Unfortunately he got into trouble with the Chinese authorities and his botanising was curtailed. Nevertheless he discovered some excellent plants well known in gardens to-day, among them *Prunus triloba*, introduced a few years later by Fortune, *Clerodendron Bungeanum* (*foetidum*), *Ceratostigma plumbaginoides*, *Jasminum nudiflorum*, *Pinus Bungeana*, and *Euonymus Bungeanus*, later introduced to Kew by Bretschneider. From 1836 to 1867 Bunge was professor of botany at Dorpat. He was of German extraction.

P. Y. Kirilov was appointed physician to this same mission and remained in China for more than ten years. Among other plants he discovered *Rhododendron mucronulatum*. He was also given by a Mandarin friend and was able to despatch to Europe one of the few authentic wild specimens of the famous Chinese drug *Panax Ginseng*. Every year the Emperor sent an expedition to Manchuria to collect roots of this most famous of aphrodisiacs for his own personal use. Luckily a friend of Kirilov was placed in command of this expedition on one occasion, and gave him this complete specimen on his return.

Still another member of this Russian mission on its journey to China was Ilia Kuznetsov, a young Cossack, sent by the famous botanist Turczaninov, who never actually visited China himself. Kuznetsov apparently did not get closer to Peking than Kalgan. He would not be mentioned except that he was the first to introduce to cultivation (at Dorpat) the lovely *Clematis* (*Atragane*) *macrosepala*, to be introduced eighty years later to the British Isles from Kansu by Reginald Farrer.

That ends the outline of plant exploration in China prior to 1834 when the monopolistic privileges of the East India Company ceased in China. Although vastly important to our modern garden flora, owing to the introduction of the *Chrysanthemum* if for nothing else, this period is only a prelude to what comes after.

You will note that at the very beginning Cunningham and others did not collect, nor did they draw attention to, varieties of Chinese florist flowers. This is surely entirely owing to the complete seclusion of Chinese home life from all European contacts. Foreign factories at the start were more like enemy outposts in a hostile country. The European inhabitants of these factories knew no Chinamen intimately and had no connection with their home life. Thus, Cunningham, and others who may have been interested in plants, knew little or nothing of the real Chinese civilisation. On the other hand actual restrictions were not so severely enforced, and they were able to move about the country districts near where the ships called.

Later severe restrictions reversed the process. Movement in the country was impossible; but gradual intercourse with richer Chinese made known the beauties of the Chinese garden flora within the bounds of the cities of Canton and Macao.

With the end of the Company's domination comes the finish of the importation into Europe of these florist flowers. In future it is collecting in the wild that almost, but not exclusively, holds our attention.

But think what had been done. A great many important plants had been introduced; and these all came from two small areas, the size of pinpoints in the mass of China. One at either extremity; Canton and Macao in the south, Peking and a narrow lane to the Siberian frontier in the north. Two tiny areas open to plant exploration, a few acres in almost a quarter of Asia.

CHAPTER III

ROBERT FORTUNE AND HIS PERIOD

I

The First Chinese War and the Exploration of Hongkong

CONDITIONS began to deteriorate long before the monopoly of the East India Company ended in 1834. The Company was, however, sufficiently powerful to be able to curb some at least of the exactions of the Chinese. With this ally removed and individual merchants left on their own the Chinese squeeze increased to an unbearable extent. The British Government having been warned that this would occur sent out Lord Napier as a kind of Minister with a small squadron, but he died shortly after his arrival and matters were allowed to slide.

The Chinese authorities constantly complained about the smuggling of opium in enormous quantities into Macao and Canton. At that period opium was firmly suppressed in China and its importation strictly prohibited. The complaint of the Chinese was quite justified. An increasing amount was exported from Bengal each year practically under the open direction of the company. This was carried to China in what were called country ships, as opposed to those that made the passage out from England, and was smuggled easily into Canton. It was certainly the most lucrative import trade in China.

The British Government has always been blamed for allowing this trade. But it must be remembered that, if the Chinese had allowed normal intercourse without the enormous and constantly increasing extortion, there would have been little or no need for a trade that could only exist by being carried on through underground channels.

The climax came when the Chinese Emperor sent the famous Commissioner Lin to Canton in 1838 with the strictest orders to put down the opium trade. One of his first acts was to stop all foreign trade of any kind and imprison foreigners in the factories until every pound of British-owned opium in the store ships lying in the river was given up. After much haggling Captain Elliott, who succeeded Lord Napier, agreed in April, 1839, and more than 30,000 chests were surrendered and destroyed. The Chinese refusing to carry out their part of the bargain, the British Government, therefore, repudiated the agreement, and in 1840 declared war; afterwards to be called the Opium War.

A fleet and expeditionary force arrived in June, 1840, with Admiral George Elliott as Plenipotentiary. The island of Chusan was at once occupied. In 1841 the forts at Bocca Tigris, at the entrance of the Canton River, were captured. Negotiations were started and an agreement was reached, but this was ratified by neither government and fighting recommenced. The British forces were under General Sir Hugh Gough. On May 25th, 1841, Canton was captured, in the autumn Chusan was again occupied, in October Ningpo was taken, on June 19th, 1842, Shanghai surrendered, on August 9th the fleet reached Nanking.

Shortly after a treaty was concluded. The terms that interest us are the ceding of the island of Hongkong and the opening of four additional ports to British trade, Amoy, Fuchou, Ningpo and Shanghai.

You will notice how this treaty at once altered conditions of plant exploration. While the interior was still strictly closed to foreigners, yet there were now five avenues of approach where there had been only one before. Nor were foreigners quite so strictly hedged in as formerly. They could move 40 or 50 miles from the treaty ports without very much difficulty.

The immediate result of this war was the botanical exploration of Chusan and Hongkong. There had already been a factory in Chusan from 1699 to about 1710 which

Cunningham had used as a base for his collecting trips through the island. Plant collecting was again undertaken by surgeons attached to the expeditionary force, Theodore Cantor, surgeon of the Cameronians, and William T. Alexander, surgeon on H.M.S. *Plover* from 1845 to 1846. The first was rather a nebulous figure with a habit of labelling his plants as having been collected at Peking and other cities which he certainly had never visited. He was sent back to India after an attack of brain fever. Alexander was much more important. He collected in the Loochoo Islands, Chusan, Fuchou, Hongkong, Woosung near Shanghai, near Amoy and a number of islands dotted up and down the coast. Unfortunately for us he was addicted to collecting Ferns and Mosses to the almost total exclusion of flowering plants. Ferns and Mosses were particularly popular about this period, and one comes across more than one case of an explorer in new territory specialising in them and neglecting everything else.

Chusan was only occupied on two occasions for short periods. It is when we come to the exploration of Hongkong that we are filled with amazement at the enthusiasm shown. Prior to its permanent occupation at the end of the war the only plants from there had been collected by Dr. Abel, but these had been lost with the rest of his collections when H.M.S. *Alceste* was wrecked. Thus the flora of Hongkong was completely unknown.

At that time the native flora of China was still awaiting collection ; its richness was unsuspected. Even in 1861, when Bentham wrote his *Flora Hongkongensis*, in the preface he remarked that the "flora of the hilly ranges of continental South China, of which Hongkong is as it were an outlying spur, is almost unknown to us; that of the country connecting these hills and the Cochin-China coasts with Burmah, Silhet and Assam, is a complete blank."

In 1841 the fact that a rocky island was in our possession and that collecting could be carried out peacefully without the constant fear of being jumped on by officious mandarins was like manna from heaven. Bentham was correct when he

called Hongkong an outlying spur of the continental range. He described almost 1000 species belonging to no less than 550 genera. Less than two species per genus is a somewhat surprising proportion to us nowadays, but it was quite understandable when the continental flora was unknown.

The Hongkong collectors were lucky in finding an area of only a little more than 29 square miles with such remarkably different physical conditions, the barren and bleak south-east compared to the sheltered ravines of the north and west. An extraordinary fact was the great rarity of a number of the plants: of *Rhodoleia Championii* there were only two trees on the island, growing side by side. Field notes of other plants read "Only three trees known in the island," "Once seen in a ravine near the top of Mount Victoria," and so on. This made the hunt all the more exciting.

The first man to make a collection was Richard Brinsley Hinds, surgeon of H.M.S. *Sulphur*. He was only there for a few weeks in January and February of 1841, a most unsuitable time of year with everything as dry as a bone and vegetative growth at its minimum. But he was able to bring home specimens of 140 species to George Bentham.

Dr. H. F. Hance and Robert Fortune will be dealt with later. Next on the scene was Captain John George Champion (1815-1854) of the 95th Regiment of Foot, who was stationed in Hongkong from 1847 to 1850. He collected over 500 species, among them *Rhododendron Championae* and that most interesting relative of the Witch Hazel, *Rhodoleia Championii*, almost a forest tree, with large red tasselled flowers instead of the usual greeny-yellow of the family. This Champion was able to introduce to Kew by means of seed. It is curious that this plant crops up again on the Salween-Irrawaddy divide, fully a thousand miles away, where it was collected both by Farrer and Forrest.

According to Bentham and Hooker, Champion was a most thorough and accurate collector. Bentham wrote that his specimens were accompanied by "analytical sketches and descriptions made on the spot, and almost always by most

valuable memoranda relating to precise station, to stature, colour, etc., which it were to be wished were less neglected by the majority of collectors." You will note creeping in the almost universal complaint of the systematic botanist against the collector, the lack of sufficient detail and information in the field notes.

Champion would undoubtedly have gone far both in the army and as a plant collector. He seems to have been a fine character and an excellent soldier. Unfortunately he was wounded at Inkerman on November 5th, 1854, and died in the hospital at Scutari, a full colonel at the age of thirty-nine.

There were various other collectors during the first ten years or so of Hongkong's life as a British Colony, but several of them, such as the American, Charles Wright, and the Kew collector, Charles Wilford, only stayed in Hongkong for a short period. That remarkable character Wright, who began as a land surveyor and deer hunter in the Lone Star State of Texas, and after an adventurous life spent his last few years in close contact with the Gray Herbarium at Harvard University, was one of the most vigorous plant hunters that the world has seen. His energy was amazing and his dried specimens particularly beautiful. His visit to Hongkong lasted from March to September, 1854, and from January to April, 1855. During that period he collected over 500 species, a collection that formed the basis of Bentham's *Flora Hongkongensis*.

The position of Hongkong on the main shipping routes and the desire of our nationals in Canton and Macao to remove as soon as possible to such a handy spot under British rule, made its growth extremely rapid. When Fortune paid his second visit in 1848 he described the garden at Green Bank. "On entering the garden at its lower side there is a wide walk leading in a winding manner up the side of the hill, in the direction of the house. On each side of this walk are arranged the trees and shrubs indigenous to the country, as well as many of the fruits, all of which grow most luxuriantly. . . . At the bottom of the terrace on which the house

stands there is a long narrow bamboo avenue, which is called the Orchid Walk. This always affords a cool retreat, even at midday, as the rays of the sun can only partially reach it, and then they are cooled by the dense foliage." He finished the description thus; "When it is remembered that six years before Hongkong was but a barren island, with only a few huts upon it, inhabited by pirates or poor fishermen, it is surprising that in so short a time a large town should have risen upon the shores of the bay, containing houses like palaces, and gardens, too, such as this, which enliven and beautify the whole, and add greatly to the recreation, comfort and health of the inhabitants."

This particular transformation scene was made more possible by the wholesale transplanting wherever possible of the plants from Beale's famous garden at Macao. But that only emphasises the fact that this growth of Hongkong was not of the mushroom variety that goes so often with rapidity.

2

Robert Fortune

At the conclusion of the Treaty of Nanking in 1842 the Horticultural Society suddenly woke up from the lethargy into which it had drifted from lack of opportunity in China. John Reeves was living in retirement in England by this time and was a leading figure in the Society. He at once realised that the great chance had come.

The treaty was only signed by Sir Henry Pottinger on August 26th, yet on December 26th we find Lord Canning writing to the energetic Lindley:

"I am directed by the Earl of Aberdeen to acknowledge the receipt of your letter of the 14th instant; and I am to acquaint you in reply, that His Lordship would suggest that the Horticultural Society should defer sending any person to China for the purpose alluded to in your letter, until the

officers to be appointed by Her Majesty, to reside in the Chinese Ports, shall have entered upon the duties of their offices, and be in a situation to protect the person who may be employed by the Society."

This letter had little effect. Reeves now came definitely to the fore as the presiding genius of what was called the Chinese Committee. This committee was active in preparing the way for a collector. Probably Reeves had a shrewd suspicion that he and his friends in Hongkong and Canton knew as much about conditions and difficulties in China as any newly appointed consuls.

On the 28th of December the Chinese Committee held a meeting at which it was resolved that a number of instruments should be furnished to their collector, beginning with thermometers and hygrometers, continuing with a spade and trowels and finishing with a life preserver.

The collector chosen was Robert Fortune. He was born at Kelloe in Berwickshire probably on September 16th, 1812. After being educated at the parish school at Edrom he served his apprenticeship in the gardens of Mr. Buchan at Kelloe. He was then employed for some years at Moredun, near Edinburgh, before entering in 1839 the Royal Botanic Garden at Edinburgh under the famous William McNab. Fortune must have been both a hard worker and a skilled gardener. After only two and a half years McNab, never an easy man to please, recommended him for the post of superintendent of the hothouse department of the Horticultural Society's gardens at Chiswick. A few months later he applied for the post and was appointed as the Society's collector in China. His travels in the Far East extended over nineteen years.

He was a prolific writer and produced four books on his journeys, *Three Years Wanderings in the Northern Provinces of China*, 1847; *A Journey to the Tea Countries of China*, 1852; *A Residence Among the Chinese*, 1857; *Tedo and Peking*, 1863. He also wrote many articles in the *Gardeners' Chronicle* and the *Journal of the Royal Horticultural Society* from 1849 onwards.

When writing for publication he was curiously impersonal, so that it is very difficult to gain any vivid impression of his character. As he was a voluminous correspondent and kept complete notes and diaries, it is more than unfortunate that most were destroyed by his family at his death. A few letters exist at the Royal Horticultural Society's offices and elsewhere which show a quiet determination to get what he wanted.

Shortly after his appointment the Chinese Committee had refused his request for fire-arms. He returned to the attack in a letter to Lindley dated January 1st, 1843: "I am much disappointed at the resolution of the Committee with regard to fire-arms, and I still hope that you will endeavour to make them alter their minds upon this subject. I think that Mr. Reeves is perfectly right in the majority of cases—that a stick is the best defence—but we must not forget that China has been the seat of war for some time past, and that many of the inhabitants will bear the English no good-will. Besides, I may have an opportunity, some time, to get a little into the country, and a stick will scarcely frighten an armed Chinaman. You may rest assured that I should be extremely cautious in their use, and if I found that they were not required they should be allowed to remain at home."

At the next meeting of the Committee it was resolved that "Fortune be supplied with fowling piece and pistols, and a Chinese Vocabulary." Perhaps the last word was with the Committee.

Three days before his departure on February 26th, 1843, on the ship *Emu* he was sent full instructions in a communication from Lindley. This interesting document is here given in full, as it is an epitome of all that was required of a plant collector in the middle of the nineteenth century when our knowledge of much of the earth's flora was in its infancy.

The instructions are dated February 23rd, 1843, and written from the Horticultural Society, 21 Regent Street.

"You will embark on board the *Emu* in which a berth

has been secured for you and where you will mess with the Captain.

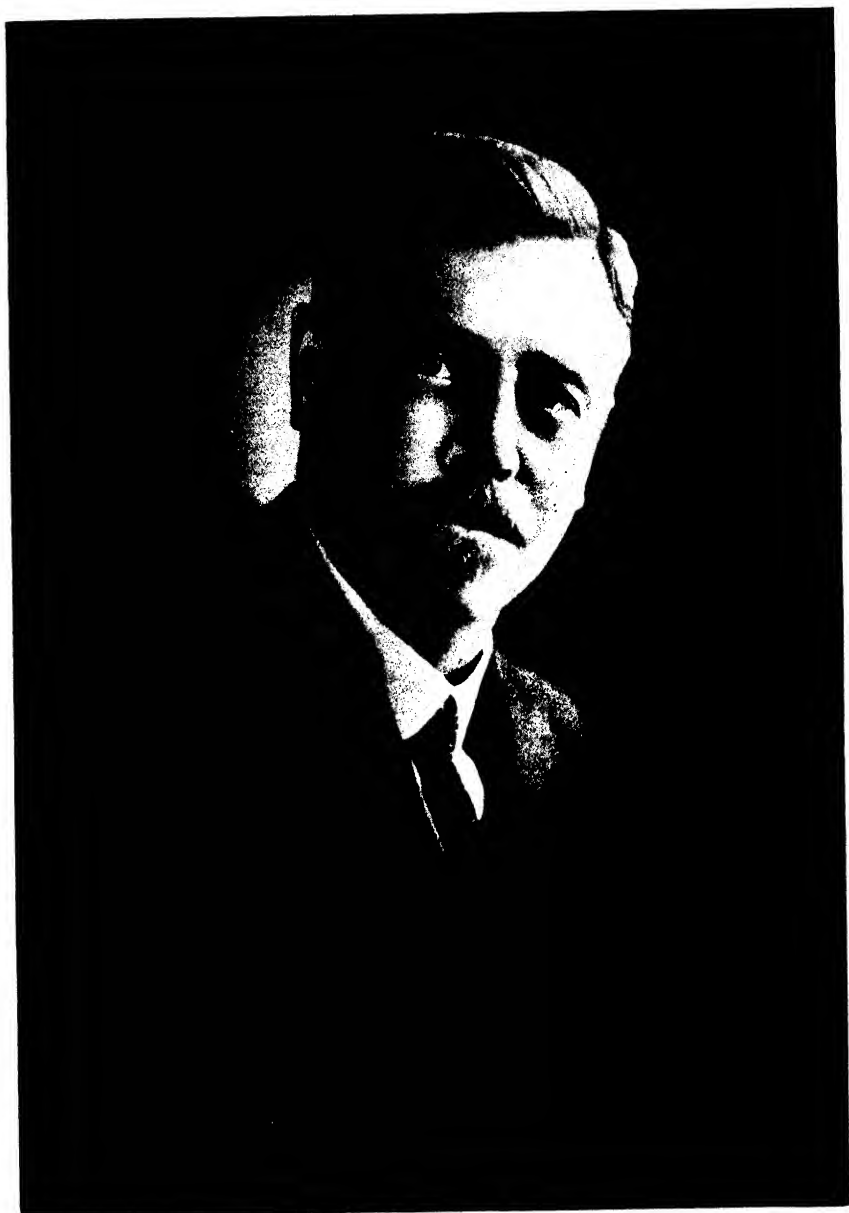
"Your salary will be £100 a year, dating from the time of your quitting charge of the Hothouse department until you resume it upon your return from China, clear of all deductions and exclusive of the cost of your outfit or such contingent expenses as may be required in carrying out the objects of the Society.

"The general objects of your mission are, 1st, to collect seeds and plants of an ornamental or useful kind, not already cultivated in Great Britain, and, 2nd, to obtain information upon Chinese gardening and agriculture together with the nature of the climate and its apparent influence on vegetation.

"With reference to these objects you are required to keep a very detailed Journal of all your proceedings, noting down daily the observations you may make or the suggestions to which the objects you may meet with give rise. This will form the materials out of which a narrative of your expedition will afterwards be prepared for the use of the Fellows of the Society.

"You will write home at every opportunity, numbering your letters consecutively, and embodying in them as much as you can the material collected in your Journal. This will enable the Society to judge of the progress you are making in your expedition. All letters must be sent in duplicate, by separate opportunities, so as to guard against the accidents to which a very distant correspondence is liable.

"In sending home plants you will always endeavour to ship them on board vessels belonging to merchants to whom you have introductions. A bill of lading is to be taken and freight will be paid in England upon the arrival of the packages. You will take care to impress upon the minds of the Captains the indispensable necessity of the glazed boxes being kept in the light, on the poop if possible, or on deck, or failing that, in the Main or Mizen-top.



IX—ERNEST HENRY WILSON



X—IN HUPEH MANY OF THE FINEST TREES AND SHRUBS ARE FOUND IN RUGGED FORM-
ATION OF CARBONIFEROUS LIMESTONE

It is also of the first importance that your seeds should be kept in some well ventilated place. All packages to be addressed to 'The Secretary,' 21 Regent Street, London, a letter of advice and bill of lading being in all cases sent by the same conveyance.

"But it is desired that although you should take advantage of such opportunities as may from time to time arise for sending home collections, yet that duplicates of the best of them be brought by yourself on your return.

"You will take out with you three cases of live plants for the purpose, 1st, of making presents to those who may be useful to you, and, 2nd, of watching the effect upon the plants of the various circumstances to which they may be exposed during the voyage—the facts relating to this will form part of your report.

"You are also provided with a certain quantity of kitchen garden seeds, the object of giving you which is the same as in the case of the plants, viz., that you may make presents where desirable and that you may ascertain the effects upon the seeds of different modes of packing, the result of which you will also embody in your report.

"The Society cannot foresee what it may be possible for you to accomplish during your residence in China; which according to their present views they wish to limit to one year, and they therefore leave you to act upon your own judgment as to the details connected with entering the country or forming collections. They are, however, advised that Chinese may be engaged at a small daily remuneration who will bring you plants up from the interior, in places where you may find it difficult or dangerous to penetrate.

"The Council do not feel able to determine what ports you should visit, or in what directions you should conduct your researches, the relations between China and England being at present too uncertain. They are, however, disposed to believe that Foo-Chou-Foo, if accessible, holds out the greatest promise of valuable results, because it is the

capital of one of the colder provinces of the Chinese Empire. If Chapoo, the place of resort of the Japanese, should be accessible on your arrival, this would be worth an immediate visit. They also wish that Goolongsoo should be visited before that place is restored to the Chinese Government—but with regard to this and all such questions the Council are willing to trust to your discretion to act as the information you may receive on your arrival in China may lead you to suppose is most advisable.

“If you should find it desirable to make Hong Kong your headquarters, it will be necessary that you should have a piece of ground in which to preserve your plants until opportunities for their shipment arrives. It is hoped that the Lieut. Governor of the Island, Mr. Johnstone, will enable you to obtain such a spot without expense, in consideration with your stocking it with such European seeds and plants as you may take out with you.

“It is needless to particularise at much length the plants for which you must enquire. It is, however, desirable to draw your attention to—

- “1. The Peaches of Pekin, cultivated in the Emperor’s garden and weighing 2 lbs.
2. The plants that yield tea of different qualities.
3. The circumstances under which the *Enkianthi* grow at Hong Kong, where they are found wild in the mountains.
4. The Double Yellow Roses of which two sorts are said to occur in Chinese gardens exclusive of the *Banksian*.
5. The Plant which furnishes Rice Paper.
6. The varieties of *Nelumbium*.
7. Peonies with blue flowers, the existence of which is, however, doubtful.
8. The fingered Citron, called Haong Yune or the Fow-Show, and other curious varieties of the genus *Citrus*.

9. The Nepenthes, which are different from those in cultivation.
10. Camellias with yellow flowers, if such exist.
11. The true Mandarin Orange called Song-pee-leen.
12. The orange called Cum-quat.
13. The Lilies of Fokien, eaten as Chestnuts when boiled.
14. *Oxalis sensitiva*.
15. *Lycopodium cernuum* called Man-neen-chang.
16. The Azalea from Lo-fou-shan, a mountain in the province of Canton.
17. Cocoons of the Atlas Moth from the same place, called Teen-tsan.
18. The Canes of Commerce.
19. Varieties of Celosia and Amaranthus.
20. Tree and herbaceous Peonies.
21. Varieties of Illicium.
22. The varieties of Bamboo and the uses to which they are applied.

"In all cases you will bear in mind that hardy plants are of the first importance to the Society, and that the value of the plants diminishes as the heat required to cultivate them is increased. Aquatics, Orchidaceae, or plants producing very handsome flowers are the only exceptions to this rule.

"You will take care that the packets of seeds which you send home shall be of sufficient size for general distribution whenever it is possible to procure them.

"You will also collect materials for the analysis of soils by putting up as many varieties of soil as may seem useful, and noting what plants best thrive in them. A quantity not exceeding two lbs. of each soil is sufficient. It is especially desirable to know in what soil the finest specimens of Chinese Camellias, Azaleas, Chrysanthemums, the Enkianthi, etc., are grown. In general the soil in which plants are received from China consists of hard lumps of mud obtained from the bed of the river.

"Although we have statements as to the manner pursued by the Chinese in dwarfing trees, more information is wanted upon that curious subject.

"It is a general practice for the Chinese to put up their seeds mixed with burnt bones. Endeavour to learn whether they do this under the idea that it preserves the vitality of the seeds, or whether they use burnt bones as a manure, sowing them mixed with the seeds; the last is not improbable. It is desirable to gain information as to the way in which they manage their manure; especially if it should appear that their processes are at variance with those adopted in Europe.

"To all collections of living plants and seeds the Society lays exclusive claim. You will also prepare for the Society one set of dried specimens of all plants that you may meet with and have an opportunity of so preserving, but any other collections which you may form will be your private property. It is, however, to be understood that the Society is not to incur any expense in forming your private collections, and that they are to be altogether subservient to the claims of the Society on your time.

"You are supplied with various tools, which you will leave in China on your return; and with fire-arms, which, before your embarkation for England, you may have an opportunity of selling to advantage, in which case you will do so and credit the Society with the amount received; otherwise you will restore your fire-arms to the Society on your return.

"When in China you will be provided with the money required for your expenses by application to Messrs. Dent & Co., who will cash your Bills drawn on the Treasurer of the Society to the amount of £500.

"All letters, seeds, plants, etc., are to be addressed to 'The Secretary' of the Society, and to no other persons, unless they relate to private matters with which the Society has no concern.

"With each letter to the Secretary you will send home

a cash account of your expenses, and you will preserve vouchers of your expenditure whenever they can be obtained, for the purpose of being audited on your return.

"The Treasurer will advance you a sum of £50 in Carolus dollars, to be accounted for at the general settlement of the account at the end of your mission.

"The letters entrusted to you for various persons should be delivered at the earliest opportunity. A list of them is attached to these instructions."

Then at the end is "Accepted. Robert Fortune."

Those instructions show clearly how little was known, or even suspected, of the vastness of the Chinese flora. Here was a committee, composed of some of the best gardeners in Britain with a very skilful botanist as secretary and with John Reeves as adviser, certainly the most knowledgeable European regarding Chinese horticulture. This letter of instructions is a most illuminating document.

Robert Fortune was certainly one of the greatest of our plant collectors in the Far East. He was obviously level-headed and calm under any storm or stress. While returning to Chusan in a junk at the end of his first expedition, they were attacked on several occasions by pirates. Fortune at the time had a severe bout of fever, but with no other Europeans to help him he dragged himself on deck, bade his own crew take cover behind the bulwarks until the pirates were close enough, then stood up and raked the deck of the pirate junk with a big double-barrelled fowling piece. Fortune drove off pirates on three separate occasions without turning a hair.

It was this complete absence of fuss, and a brain that was always cool and collected, that got him out of a number of tight corners, for some of the areas which he visited were distinctly anti-foreign. He obviously had not one ounce of humour in his make-up; but possibly he was none the worse of that. As a makeweight he had no false pride, and his books are written with a directness and absence of frills that make them excellent reading to-day.

It is only natural that on this first expedition to China Fortune was unable to journey far afield through force of circumstances. Peace had only lately been declared, and conditions near the coast were still unsettled. No European knew the interior of the country well enough to advise where plants might best be collected. Even Reeves could have received little information from his Chinese friends, as no Chinaman of any wealth or education would dream of travelling far from his own province unless absolutely forced to.

The title of Fortune's first book incorporating *Northern Provinces* is, of course, misleading. The farthest north that he reached was Soochow; and that only once. His main headquarters in the so-called North was Shanghai.

After leaving Hongkong in August, 1843, he sailed for Amoy and from there to Chusan. During this journey he was severely buffeted on the junks in which he travelled, and was twice nearly wrecked. He returned to Chusan on several occasions; thus he was able to explore the island thoroughly. From there he visited Ningpo on the mainland opposite, and the Tea districts in the nearby hills. He was one of the first Europeans allowed to make a critical examination of Tea growing and manufacture, and to describe its cultivation in detail.

Fortune was very successful on this first trip, although he never went more than 30 miles away from a treaty port. He had a real flair for collecting, and, above all, had perfect judgment about the necessary requirements for a good garden plant. This is noticeable throughout all his many years in the East. It may be said that, when no one had been there previously to skim the cream off the milk, the separations of one from the other was a simple matter. But Fortune introduced very few mediocre plants; his average was distinctly high.

So enthusiastic did he become over the plants to be seen in private and nursery gardens at Shanghai that the native nursery gardeners took fright. They became terrified that Fortune would seize their entire collections of plants without

paying for them. So much so that they placed small boys on watch to warn them whenever Fortune appeared. Then the nursery gates were at once shut and padlocked: the nurseries were in a state of siege. After six or seven attempts on his own to come in contact with the owners and start bargaining, he became tired of this treatment. He asked the help of a Chinese officer to explain that he would gladly pay for everything he took. After unlimited tact and patience Fortune won their confidence. In the end the nurserymen offered him every plant in Shanghai; but only after the waste of many weeks.

It is quite impossible to mention more than a few of his introductions. On this first expedition he was particularly lucky; he was the first on the scene. Although ignorant of the language, he was not overcome with shyness at the lack of a common tongue, and was very successful in inspiring the Chinese with confidence in his honesty. He was there alone; with no opposition he was able to choose what he wanted with due discrimination and without haste. He was not, however, able to collect all the plants mentioned in his instructions.

One of the first of his finds to reach England was *Anemone japonica* (now to be called *A. elegans*) which he found blooming in November in Chinese graveyards, "a most appropriate ornament for the last resting places of the dead." He at once despatched roots and by 1844 it was in flower at Chiswick.

Almost his favourite introduction was *Diervilla florida*, usually known by its other name of *Weigela rosea*. He came across this constantly in Chinese gardens, although it is a native of Japan and not found wild in China. "Another plant, certainly one of the most beautiful shrubs in Northern China, the *Weigela rosea*, was first discovered in the garden of a Chinese mandarin near the city of Tinghae on this island [Chusan]. This spring it was loaded with its noble rose-coloured flowers, and was the admiration of all who saw it, both English and Chinese."

Two early-flowering climbers both originate from his first expedition, *Lonicera fragrantissima*, and the universal favourite *Yasminum nudiflorum*. The latter Fortune introduced, although

it had been found first by Bunge at Peking. Other well-known plants are *Dicentra spectabilis*, *Platycodon grandiflorum*, *Forsythia viridissima*, *Chamaerops Fortunei*, *Ilex cornuta* and *Cryptomeria japonica*.

As was pointed out before, the Tree Peony was not cultivated near Canton, although it was brought down every year from the north in vast quantities and forced into flower. Near Shanghai Fortune found himself in the centre of its area of cultivation and introduced on various occasions many varieties which were not seen in Canton. In 1844 and 1845 he sent home twelve or thirteen new varieties, some of great beauty. Another florist flower that he came across near Shanghai and Soochow was *Rhododendron (Azalea) obtusum* in several of its innumerable forms. On the other hand by this time China could teach Europe nothing about the Chrysanthemum, although Fortune did send home two small varieties from Chusan that became the parents of our Pompoms.

On his return to England in 1846 Fortune was appointed Curator of the Chelsea Physics Garden, but only held this post until 1848, when he was commissioned by the East India Company to return to China, this time on their behalf. The object of this trip was no less than the introduction of China Tea into India where the Company hoped to start its cultivation in Sikkim and Assam. With the consumption constantly increasing in the British Isles they must have realised for many years the possibility of transferring its cultivation to some area less liable to the extortions of the Chinese. What had been lacking was the means.

For centuries the Chinese had been extremely jealous of their Tea industry. Not only had all foreigners been rigorously excluded but all information that was at all accurate had been withheld. It was only after the Treaty of Nanking that a visit to the Tea districts was at all possible. After the success of his first expedition Fortune was obviously the man.

He left England in June, 1848, this time in a steamship and landed in Hongkong in August. He transhipped almost immediately for Shanghai. He remarked at once on the great

change that had taken place since his last visit. There was an English quarter, a great source of wonder to Chinese from the interior, and several good gardens. Probably the best belonged to Thomas Beale, son of the owner of the once famous Macao garden. Here Fortune found almost all the shrubs and trees that he had introduced to England on his last journey. One curious point he noted was that the demand for nursery stock of various kinds had so increased the supply from a distance, such as Soochow, that sturdy trees of *Cryptomeria* 4 feet high were selling in Shanghai for a penny each, and good plants of the fine form of *Gardenia florida* called after him for two shillings a hundred.

Fortune wasted no time in Shanghai and left almost at once for the Tea districts of Anhwei and the Bohea Hills. Apart from Tea these districts have a much more interesting flora than that of any other part previously explored in detail by a European. He found *Cupressus funebris*, previously seen by Macartney's Embassy, and managed to collect seed. This was one of his finds that most excited him, and he waxed almost lyrical in his description. The effect is rather spoiled when he likened it to "Some of those large and gorgeous chandeliers, sometimes seen in theatres and public halls in Europe." Lindley was also enthusiastic, and called it almost perfect for graveyard decoration, a subject dear to the hearts of many Victorians. However, it is only hardy in the most sheltered of Cornish gardens and is useless elsewhere.

A much greater find was *Berberis* (*Mahonia*) *Bealei*, the finest of all that group. He was collecting Tea seeds in Southern Anhwei, when he saw a magnificent Funereal Cypress in a deserted garden. "Having taken a survey of the place, we were making our way out, when an extraordinary plant, growing in a secluded part of the garden, met my eye. When I got near it I found that it was a very fine evergreen *Berberis*, belonging to the section of *Mahonias*, and having of course pinnate leaves. The shrub was about eight feet high, much branched, and far surpassed in beauty all the other known species of *Mahonia*. It had but one fault, and that was,

that it was too large to move and bring away. I secured a leaf, however, and marked the spot where it grew, in order to secure some cuttings of it on my return from the interior." Later he had considerable difficulty in getting any Chinese to part with plants, as it was supposed to have some potent medical virtue. In the end he managed to buy three young plants, which he carried safely to Shanghai and then shipped to England. From these our entire stock has come.

But such plants were only by-products on this trip. His main object was to learn as much as possible about Tea and to collect plants and seeds of the best varieties. He visited the best green Tea districts, inland from Ningpo, and then moved south to Fokien and explored thoroughly the famous Woo-eshan range where the finest Bohea or Black Tea came from, not far from Foochow. Fortune stuck to his assertion made during his previous journey, that Green and Black Tea came from the same variety, and that the colour and flavour was only a matter of manufacture. In this he was perfectly right, although doubt was cast on his assertion for many years after. Even Bretschneider was none too sure.

Nothing speaks more highly for Fortune's skill as a traveller and intensity of purpose than his collection of Tea plants and seeds. He knew that the Chinese were distinctly suspicious and hostile to the idea. He travelled as a native from a distant province. As he stated quite definitely that he passed as a native without question, presumably this was the case, for Fortune above everything was truthful; but it is hard to believe that a foreigner could pass as a Chinaman, from however far afield, after only three or four years sojourn in the country.

Yet he was eminently successful in his quest. In the first year he sent quantities of seed to Calcutta, some mixed in dry earth and some loose. Tea seed, like that of all Camellias, is very short-lived, and hardly a seed of this first year's sending germinated. Profiting by this experience Fortune in 1849 sowed the seed in Wardian cases among young Mulberry plants. Many of the seeds germinated during the voyage and

survived. In the final year he again collected seeds and plants. In February, 1851, he himself sailed for Calcutta with 2000 young Tea plants, 17,000 germinated seedlings and six expert Tea makers.

It is hard to think that to-day scarcely a descendant of these Chinese plants survives in India. Except for a few hybrids in some of the oldest gardens near Darjeeling and in the High Range north of Travancore, all the Tea plants in India come from the indigenous Assam Tea. Indeed, one of the latest theories in this most complex subject is that China Tea originated from this same Assam Tea plant transported to China centuries before. The Tea plant is a problem that has worried botanists for many years. It looks as if it would go on worrying them for many more.

Towards the close of 1852 Fortune was asked a second time by the East India Company to go to China and collect more Tea seed and plants. In addition, he was commissioned to engage some more Black Tea makers to return to India with him. He spent from 1853 to 1856 on this third expedition. Again he wrote a book on his return, *A Residence Among the Chinese*. Both expedition and book were dull compared with the two earlier efforts. He revisited the Tea districts far inland and then worked back nearer the coast which he had neglected before. Uneventful though this journey was, he was again eminently successful in accomplishing what he set out to do and left for Calcutta with many thousands of plants and seedlings and a further consignment of Tea makers.

He was also successful in introducing from this journey two most important plants, *Prunus triloba*, which Bunge had found previously in cultivation in Peking, and *Rhododendron Fortunei*, which has played such an important part in our modern hybrid Rhododendrons.

"In a romantic glen through which we passed on our journey I came upon a remarkably fine-looking rhododendron. A species of the genus [*R. Championae*] had been discovered on the Hongkong hills, but none had previously been met with to the northward, although the azalea is one of the most

common plants on the mountains of Chekiang, I therefore looked upon the present discovery as a great acquisition, and as the plants were covered with ripe seeds, I was able to obtain a good supply to send home. All the Chinese in that part of the country agreed in stating that the flowers of this species are large and beautiful, but as all rhododendrons have this character, it is impossible to predict what this one may turn out to be until we have an opportunity of seeing its flowers. Mr. Glendinning, of the Chiswick nursery, to whom I sent the seeds, has been fortunate enough to raise a good stock of young plants, which are now growing vigorously, and which will soon determine the value of the species."

In 1860 Fortune started off on his fourth and final journey to the East. He gives no inkling who financed this trip ; it was certainly not undertaken on behalf of any special body. As he mentions in the preface of *Yedo and Peking* that one of his objects was to collect works of art, possibly it was a venture of his own with some prior arrangement about the distribution of plants through the well-known nursery firm of Standish and Noble.

Japan had only just reopened her doors to foreigners for the first time since 1636. It was only natural, therefore, that it was still impossible to go far afield. He was only a week in Nagasaki, and a few months during the winter of 1860-1 and spring and summer of 1861 in the neighbourhood of Tokyo (then called Yedo) and Yokohama. Here was a repetition of the early days in Canton; collecting was limited almost entirely to what the Japanese grew in their gardens. And yet what was introduced was good because no one apart from Siebold had been there before.

What were of major interest to gardeners at home were the new varieties of *Chrysanthemum*. Near Tokyo he saw famous collections: "At the time of our visit they were in full bloom, and most certainly would have delighted the eyes of our English florists had they found themselves so far away from Hammersmith, the Temple, or Stoke Newington. I procured some extraordinary varieties, most peculiar in form

and in colouring, and quite distinct from any of the kinds at present known in Europe. One had petals like long thick hairs, of a red colour, but tipped with yellow, looking like the fringe of a shawl or curtain; another had broad white petals striped with red like a carnation or camellia; while others were remarkable for their great size and brilliant colouring. If I can succeed in introducing these varieties into Europe, they may create as great a change among chrysanthemums as my old protégée the modest Chusan Daisy did when she became the parent of the present race of pompoms."

Most of this collection reached England safely and did cause a sensation.

He introduced *Sciadopitys verticillata*, the Umbrella Pine, *Osmanthus ilicifolius* and the well-known *Deutzia scabra flore pleno* from Japan, and just missed by a very few weeks being the first to introduce *Lilium auratum*. He was beaten by J. G. Veitch.

His greatest find, however, was most probably *Primula japonica*: "I shall never forget the morning on which a basketful of this charming plant was first brought to my door. Its flowers of a rich magenta colour, were arranged in tiers, one above another, on a spike nearly two feet in height. It was beyond all question the most beautiful species of the genus to which it belongs, and will, I doubt not, henceforth take its place as the 'Queen of the Primroses.'" For some reason or another he was unable to have seed introduced until 1870, when it was sent to him in England by William Keswick, who was head in the East of Messrs. Jardine Matheson.

On his way back to Shanghai, Fortune visited Peking for a few weeks. There he visited nurseries as usual and made a short trip to a monastery in the Western Hills. He arrived back in England on the 2nd of January, 1862, and his travels were over.

Most of the eighteen years of his retirement were spent in farming in his native Berwickshire. Occasionally he came

out of his shell to write an article for *The Gardeners' Chronicle* or appear at a flower show.

Owing to the loss of his personal papers and letters it is difficult at this length of time to gauge just what sort of a man he was. It is impossible to judge from his published writings. Although these are quite unassuming and very easy to read, yet they are very impersonal.

He must have had remarkable tact to travel so freely among a population that was frankly antagonistic without coming to any harm. Above all he had a marvellous eye for a plant, and his technique in packing and shipping his introductions was beyond all praise. There is no man in the history of plant introduction who has lost fewer plants. There have been greater plant collectors, but no plant introducer has excelled Robert Fortune.

3

An Intermediate Period

With the exception of Robert Fortune there is no outstanding British collector in the period covered by this chapter. On the other hand, a great deal of quiet and unobtrusive work was being carried out as Europeans slowly edged their way farther and farther into the vast interior of China.

For the time being the days of the professional collector were more or less finished. There were one or two special exceptions, but as a rule plant collecting for nearly half a century was confined to men with other jobs, consular officers, those in the employ of the Chinese Maritime Customs, medical men and, above all, missionaries.

During this period, and for a long time after, the botany and collecting in China and the neighbouring countries was controlled almost entirely by two men, Henry Fletcher Hance (1827-1886) an Englishman in the south and Carl Johan Maximowicz, a Russian of German extraction, in the north.

They were both great men, and great friends, although separated by thousands of miles they never actually met. But they were the brains behind all collecting in China for many years. Their specialised knowledge was such that no one else could do the work so well in their respective areas. So all the herbarium material flowed into their hands; when thoroughly digested, it flowed out again in the form of correctly named dried material for various herbaria and was fully described in scientific journals. With the exception of the far west which was still more or less unexplored during their lifetime much of our knowledge of the flora of China is due to their labours. And mighty labours they were, necessitating a most retentive memory and a knowledge of plants only gained after many years' experience. There were many pitfalls for the unwary, and much that is careless has been published by others. F. A. W. Miquel's *Prolusio Florae Japonicae* of 1866 and H. Léveillé's *Catalogue des Plantes du Yun-Nan* of 1915 are examples, while not so very long ago, in 1898, Bretschneider complained about the Royal Botanic Garden at Edinburgh. He wrote that some of the Edinburgh work contained "very imperfect and loose determinations, generally only the genus name is given." Then he ended with the scathing remark: "Of course, Edinburgh is not the proper place for determining Chinese plants." Needless to say, within a very few years that became quite and totally untrue.

Hance was a remarkable man. He was born in 1827 and was educated partly in London and partly on the Continent. He was an expert linguist, completely word perfect in Latin, Greek, French and German. Oddly enough he always flatly refused to learn Chinese, although he lived in China for forty-three years. Clever though he was, this refusal placed a definite brake on his career in the consular service. He never rose above the post of vice-consul at Whampoa, twelve miles below Canton.

He came out to China in 1844 at the early age of seventeen, a year after Fortune's arrival. In his early years in China he suffered much from malaria and in 1851 had to return to

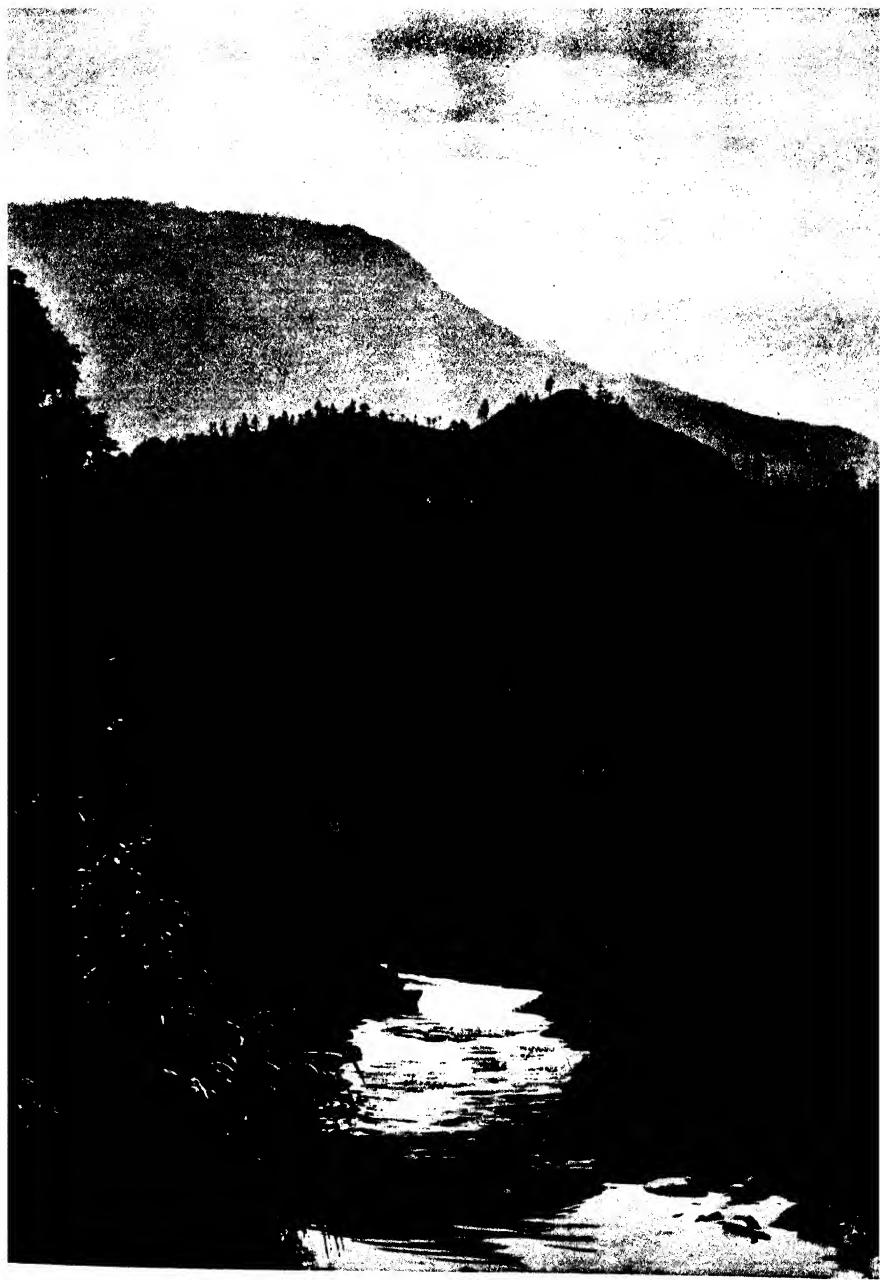
England to recuperate. He married and returned to Hongkong in 1852. For some years he was senior assistant at Canton, but in 1861 he was made vice-consul at Whampoa, where he lived until his death in 1887.

His own personal collecting was not of great importance. He collected in Hongkong as a young man with Champion, and later in the neighbourhood of Canton and Whampoa, while in 1866 he made a trip to the island of Hainan. But there he sat, first of all in Hongkong and Canton and then at Whampoa, interviewing every one who was at all interested in plants, persuading them to collect wherever they might be going and to send their material to him. The number of his collaborators was astounding and says a great deal for his undoubted powers of persuasion.

Dr. C. F. M. de Grijps, a Dutch military surgeon, collected in Amoy; William Gregory, a consul, at Foochow; William Tarrant at Ningpo; Dr. C. Fabre-Tonnerre, a French Physician, in the neighbourhood of Shanghai; even Delavay collected for Hance until, during a holiday in Paris, Père David introduced him to Franchet, to whom Delavay promised to send all his finds in future. Hance collected collaborators into his net from far and wide. His herbarium is now at the British Museum (Natural History) in London.

Charles Wilford was one of the few professional collectors during this period. Sir William Hooker heard that the British Government were sending a steam yacht, the *Emperor*, as a present to the Emperor of Japan. With his usual astuteness he thought this too good a chance to lose and arranged with the Admiralty to add one of the young men employed in the Kew Herbarium to the yacht's complement. Charles Wilford was chosen.

Nothing much is known about him. He left the yacht in Hongkong and visited Formosa on H.M.S. *Inflexible*. Later he joined a sloop, H.M.S. *Actaeon*, which made a tour of exploration round Corea and some of the Japanese islands. Considering his opportunities, Wilford must be written down as more or less a failure. He spent almost three years in the Far East;



XI--WA-WU-SHAN IN THE WILDERNESS, ONE OF THE WILDEST AREAS IN CHINA



XII—WA-SHAN, AN ISOLATED MOUNTAIN OF 11,000 FEET WITH A FINE FLORA

yet no one mentions him. Even his plants yielded no great treasures, although he was one of the first to touch at many points in Corea and Japan.

During this period the Russians were becoming more and more active in the north, including Chihli and the northern Chinese provinces, Manchuria, Mongolia, and Corea as well as Siberia. Alexander A. Tatarinov was the first of importance. Like so many of these earlier botanists he began as surgeon to the Ecclesiastical Mission in Peking, where he dwelt from 1840 to 1850. He remained in the East for another ten years, and showed great ability in his dealings with the Chinese. He never went far afield from Peking in his collecting trips, but he discovered some fine plants, including *Paeonia obovata*.

Then appeared Carl Maximowicz, one of the greatest figures in the botany of the Far East. He was lucky in being a pupil of Bunge, which, of course, gave him an interest in China from the very start of his career. Before he was twenty-five he was appointed Curator of the Herbarium at the Botanic Gardens of St. Petersburg. A year later, in 1853, he was commissioned by the director to accompany as botanist the frigate *Diana* on a voyage to the Far East. For three years he collected in the neighbourhood of the Amur and Ussuri rivers before returning home to St. Petersburg overland.

In 1859 he set off across Siberia on his second great collecting trip which was to last five years, this time in Manchuria and Japan. His haul in Japan was remarkable, although many of the plants he found were not introduced into cultivation until Professor Sargent collected in Japan in 1892 for the Arnold Arboretum. A glance at the list of Maximowicz's finds shows at once that he actually collected far off the beaten track among the hills in a manner that Fortune and Veitch never dared to do.

Here are a few of the plants found by the great Russian: *Stewartia Pseudo-camellia*, *Acer capillipes*, *A. nikoense*, *Disanthus cercidifolius*, *Epigaea asiatica*.

Yet he did not neglect collecting seed wherever possible. *Magnolia stellata*, *Hypericum patulum*, *Acer rufinerve*, *Corylopsis*

pauciflora, *Rhododendron brachycarpum* and *R. rhombicum*, *Clerodendron trichotomum* and *Abies brachyphylla* were introduced by him to St. Petersburg and some ultimately made their way to the British Isles. He also collected a magnificent lot of bulbs from which he hoped for great results, but the box fell by the wayside and the contents were promptly eaten by pigs, a sad blow.

From 1869 to his death in 1891 Maximowicz was chief botanist at the Botanic Gardens at St. Petersburg, where he spent most of his time in determining plants sent by his collectors in the Far East. Once his collecting days were over he sat, like Hance, in the middle of his herbarium and worked on the results of others—Tchonoski, Przewalski, Piasetski, and so on. He was a man of high ability and immense erudition. His publications are among the most important contribution ever made to the understanding of the flora of Eastern Asia.

CHAPTER IV

THE AWAKENING IN CHINA

I

The War of 1860

THE WAR OF 1860 between the allied power of Britain and France and the Chinese was a silly affair. The actual cause was petty, the seizure by Chinese officers of some Chinamen from a small vessel flying the British flag called the *Arrow*. This was on October 8th, 1856. An apology was at once demanded, and refused. Whereupon Admiral Seymour sailed up the Canton River and did some damage. The Chinese not to be outdone retaliated by sacking and burning the foreign factories.

The British Government decided to act and found a willing ally in Napoleon III, who wished to avenge the torture and murder of a missionary at the order of a district magistrate in Kwangsi. Lord Elgin was appointed for Great Britain and Baron Gros for France. At the end of 1857 Canton was captured and by the middle of May, 1858, the Taku Forts below Tientsin were stormed. By the beginning of July peace had been signed between China and Great Britain, France, Russia and the United States. In this it was agreed that the Yangtze should be opened to foreign traders as far as Hankow; in addition, various additional ports were opened to foreign trade, mostly of secondary importance on the islands of Hainan and Formosa.

In the spring of 1859 the new and duly accredited ministers to the Chinese court at Peking arrived only to find that the Chinese had spent the previous six months in rebuilding and strengthening the Taku forts and in forming a strong boom across the mouth of the River Peiho.

Gunboats advanced to force their way up river only to find that the forts could really shoot. Four of the boats were sunk and almost every vessel was silenced. The ministers hastily retired to wait for reinforcements. Lord Elgin and Baron Gros were at once reappointed, and fighting began again in the early summer of 1860. The forts were carried, Tientsin captured and the army marched to Peking. Peace was made.

Although the affair was trifling the results of this treaty were far-reaching. A third set of ports were opened for trade, among them some on the Yangtze; but most important of all, subjects of the Treaty powers were allowed to travel in the interior of China and missionaries were allowed to work where they liked. This was at once a passport to the scientific exploration of the whole of the enormous Chinese Empire. Not only were expeditions of all sorts and sizes possible from now on, but the additional European population in the country, members of the much enlarged consular service, additional missionaries, personnel of the newly formed Imperial Maritime Customs under Sir Robert Hart, and so on, contained many who were extremely interested in natural history in all its branches.

Dr. Hance was, of course, more than delighted to enlarge his staff of voluntary helpers and collectors. Their numbers swelled greatly during the next twenty years, and his net was spreading wider and wider. Although this period produced a remarkable zoologist in Robert Swinhoe, during the first ten years there was no Britisher who excelled in plant collecting.

Theophilus Sampson, a colleague of Hance, completed the collection in the hills round Canton. He was energetic and thorough, but the cream had already been found and his list of plants does not make very exciting reading.

Richard Oldham, after whom *Rhododendron Oldhamii*, one of his finds in Formosa, was named, might have done better if he had lived, but he died in 1864 just when he was getting into his stride. He was sent out from Kew in 1861 as a sort

of successor to Wilford. He began by collecting in Japan, first near Yokohama and in the following year round Nagasaki. In his third year he was in the Korean archipelago. His most important trip, however, was shortly before he died, when he went to Formosa as a guest of Swinhoe who was British Consul there. At this time Formosa was almost untouched botanically. As far as his health permitted, Oldham did well. If he had lived, he might have advanced our knowledge of the Formosan flora by many years.

A few years later we hear of Yunnan for the first time. In 1868 Sir Percy Sladen was sent by the Indian Government to try and find out some possible trade routes between Upper Burma and Yunnan by way of Bhamo on the Irrawady. He took with him as medical officer and naturalist John Anderson. This was at a time when the Mohammedans controlled almost the entire western frontier of China. They were more than usually difficult to deal with in Yunnan and the expedition never got farther than Tengyueh, so well known afterwards as a starting-off place for George Forrest and Kingdon Ward. While at Tengyueh Anderson was able to collect near the town, but the mission was so closely guarded that he brought back little of importance. One of the few plants to interest us was the lovely *Codonopsis convolvulacea*. Still this was a start; these were the first plants to come from Yunnan.

In the same year a remarkable attempt had been made by Thomas Thornville Cooper, afterwards our agent in Bhamo, to make a journey in the reverse direction; that is to cross Yunnan from the Yangtze and enter Burma by way of Bhamo. He had travelled along the main road to Lhasa as far as Tatsien-lu and Batang where he turned south down the Mekong Valley. He got as far as Weisi in north-western Yunnan, when he was arrested and made to return the way he came. He was very lucky to have escaped with his life. For many years that was a treacherous part of the country.

This is only an example to show how far afield our travellers were making their way. Cooper had no interest in botany and collected no plants.

The first Britisher to travel from the Yangtze to the Irrawaddy was Augustus Raymond Margary. This remarkable young man was the best type of British consular official. He went to China in 1867, in his twenty-first year, as student interpreter. The speed with which he learned Chinese was exceptional, and in 1870 he was despatched to Formosa as consul at Tamsuy. Here he became interested in botany, but was not stationed long enough in Formosa to make any large collections. He was shifted about from place to place until in August, 1874, he was ordered to proceed at once and secretly to Bhamo, there to await Colonel Browne's mission. He wrote to his mother that "it is a long and to a certain extent perilous journey—I can't disguise that fact."

Ill-luck dogged him, and ill-health. The route he took was that which afterwards became the chief highway from the Yangtze to Yunnan-fu, from Hankow through the Tungting Lake, up the Yuan River, by way of Kwei Yang to Yunnan-fu; then up to Tali-fu, Tengyueh and so to Bhamo. He reached his goal after a thousand-mile journey through new country, and during almost every hour of the journey he was a sick man. He had pleurisy, rheumatism and toothache. "One disease after another attacked me with relentless rapidity; even dysentery came to add its terrors to my loneliness, and reduced me to a skeleton. All my pride of flesh and muscle speedily vanished beneath its dire influence."

He recounts that when he suffered the pangs of loneliness and homesickness he found the best cure was to get out into the open and sing all the old songs he knew at the top of his voice, ending with "God Save the Queen."

After meeting Colonel Browne's mission he started off in advance of the main body to prepare the way for them but was murdered at Manwyne about 45 miles east of Bhamo.

Margary's murder was at once reported to Peking by way of Rangoon. Our minister immediately despatched a mission to examine the circumstances on the spot. This mission included Edward Colborne Baber, at that time a consular interpreter and afterwards, as consul at Chungking, to be-

come one of the most important influences in western China. During this period he made two important journeys through country that was afterwards more thoroughly explored by E. H. Wilson. The first was to the famous Mount Omei and then south-eastwards through the Lolo country; the second to Tatsien-lu on the main road to Tibet.

Unfortunately Baber seemed to have no interest in plants. What he did prove was the possibility of travelling the byways of western China with comparative safety so long as care was taken.

A year or two later the Rev. J. McCarthy of the China Inland Mission travelled overland from the Yangtze to Burma by way of Kweichow and Yunnan-fu. He collected a few plants on the way and two new ferns were called after him.

That remarkable traveller, Captain William John Gill, was more interested in botany. He was one of those men who are born to wander. In nine years he explored extensively in Persia, Transcaspian Russia, Yunnan and Eastern Tibet, Afghanistan, and Tunis before he was murdered by Bedouins while carrying out investigations for the British Government in the Peninsula of Sinai.

His Chinese trip started off, as so many others, from Chungking. From there he went to Chengtu and then on to the alps of northern Szechuan. On his return to Chengtu he began with W. Mesny his great journey through the Tibetan marches to Tatsien-lu, Litang, Batang and Atuntze, all names well known to those who have followed the travels of later collectors. From Atuntze they struck southwards to Tali-fu and then by way of Tengyueh to Bhamo.

This journey from Chengtu to Bhamo took place between July 10th and November 1st, 1877, a distance of 1110 miles, an average of more than 10 miles a day including stops. You will gather that this was a very remarkable performance. The speed and ease of this trip, most of it through unknown country, was much of it due to Gill's companion, Mesny. This man from Jersey had been in the employ of the Chinese Government from the time of the conclusion of the

war of 1860 and ultimately rose to be a major-general in their army. His knowledge of the country and its language was unrivalled.

Gill collected a few plants during this trip, but naturally on a journey of this kind collecting had to be sacrificed to speed. Without being botanically minded he had an eye for his surroundings, and his journal, which was afterwards published under the title *The River of Golden Sand*, contains many passages like the following: "The tops of the mountains were crowned with dark forests of firs, and the valleys opening east and west disclosed a vast extent of pine-clad heights. The bed of the river was much wider, and bounded by slopes clothed with shrubs of many descriptions, amongst which wild flowers grew in profusion; in one spot there was a field of wild roses, one mass of blossom, and the air was literally laden with the delicious perfume. On the northern slopes were charming little woods of the freshest green; and the yellow flowers of the barberry, everywhere abundant, helped to give that warmth to the colouring that always seems to characterise a Chinese landscape."

It is a pity that Gill had not remained in China. With his love and knowledge of the country he might have become a great collector, if he could only have curbed his passion for speedy travel that seemed to have been an obsession with him throughout his life.

Mesny was his equal as a keen and rapid traveller. After reaching Bhamo and spending a year in England on leave, he landed in Canton in 1879 and spent the next four years in rushing to and fro across China from Kwangtung to Kansu in the extreme north-west (there he visited Farrer's country of *On the Eaves of the World*, Lanchow and Sining, as far as the Koko-nor), from Szechuan to Peking. Hance as usual roped him in, and Mesny sent him a number of plants; but he was too fond of quick movement to be a great collector.

With a constant increase in the personnel of the Chinese Maritime Customs and our Consular service, Hance was able to press more and more willing helpers into his service. By

now he realised the almost unbelievable richness of the flora of western China. Whenever he heard of any one making for the west he persuaded them to collect for him if at all possible. Unfortunately Hance was more of a botanist than a gardener. He made little effort to introduce new plants to the British Isles, nor did he impress on his helpers the necessity of collecting anything except herbarium material. The consequence was that, although many fine plants were discovered, their introduction had to wait, sometimes for many years.

For instance, *Viburnum utile* was discovered by Thomas Watters near Ichang in 1879: it was not introduced until 1901 by E. H. Wilson. Watters also found *Primula obconica* introduced a few months later by Charles Maries, and wild plants of *Primula sinensis* which was not introduced until about 1895. Then another consul, W. R. Charles, found the lovely *Viburnum Carlesii* near Chemulpo in Korea about 1883; it was not sent to Kew until 1902, and then from Japan.

During the same period an American missionary, the Rev. B. C. Henry, was collecting assiduously in south China, specially in Kwangtung. The plants from this area are all more or less sub-tropical or tropical and of no great interest to horticulture. In the far north H. E. M. James with H. Fulford and Francis Younghusband visited the famous Long White Mountain in Manchuria where the River Sungari rises. Then he went to Mukden by way of Kirin. They collected a number of plants, but nothing of great importance.

It was obvious that little was being done in the way of introduction by men already in China. Then the famous nursery firm of James Veitch and Sons again began to interest themselves in the Far East. They chose one of their foremen, Charles Maries (1851-1902), who had the added advantage of having had Professor Henslow, the botanist, as his headmaster while at school. Maries was told to concentrate on Japan, particularly with a view to collecting seed of Conifers, and on the valley of the Yangtze. As Maries was in the Far East from 1877 to 1879, this proves the perspicacity of the Veitchian firm. They stuck to this idea through thick and

thin until they were proved to be correct so magnificently in the trips of E. H. Wilson in the period from 1899 to 1905.

Maries was moderately successful in China and did well in Japan. But he seemed to miss fire somehow. The Veitches themselves said that "he had enthusiasm but lacked staying power." On arrival at Yokohama he went to Nikko and then straight north to Hakodate in Yezo and Sapporo. In that swampy and wet island he found and collected that fine campanulad *Platycodon grandiflorum* var. *Mariesii* and the so-called *Lilium Thunbergianum* with *Abies Veitchii* and *A. Mariesii*. Other plants he introduced from Japan were *Enkianthus campanulatus*, *Styrax Obassia*, *Abies brachyphylla* and *Conandron ramondoides*.

After spending almost a year in Japan he returned to Hongkong before going for a few weeks to Formosa and then on to the Yangtze where he collected round Kiukiang. Much the most important plant from this area was *Lilium speciosum* var. *gloriosoides* which has since become so popular a garden plant. He might have done more if he had not had to return to the coast owing to a severe attack of sunstroke.

Maries spent the summer and autumn of 1878 in Japan almost for the sole purpose of collecting Conifer seed, at this time a very strong point with the firm of Veitch. In the spring of 1879 he went up the Yangtze as far as the Ichang Gorges. Apparently he had trouble of some kind with the natives whom he obviously did not understand. They ended by robbing him of his luggage and he hastily returned to Japan. His visit to Ichang, however, was not entirely fruitless as he was able to collect quantities of seed of *Primula obconica*. From this trip he was also able to introduce *Hamamelis mollis* and *Rodgersia podophylla*.

Maries certainly introduced a number of fine plants; but one is left with the opinion that with his advantages much more could have been done in the three years he spent in the Far East.

During the period from 1871 to 1902 Hongkong was lucky in having Charles Ford (1844-1927) as the superintendent of

the Public, later Botanic, Gardens. He spent much of his time trying to improve the appearance of what was little better than a rocky waste by the introduction of ornamental and useful plants from the mainland. Although he had to work mostly with the semi-tropical flora of the more southernly provinces, yet he took great interest in trying to introduce fine plants into general cultivation. If they succeeded well under his care at Hongkong, he almost always sent home living material to Kew or to the firm of Veitch. *Illicium verum*, *Eomecon chionantha*, *Asarum caudigerum* and many other plants were introduced in this way.

It is interesting to note that Ford was the first man in China to make extensive use of native collectors. Previously individual plants had been obtained from a distance through Chinese sources, but collection had only been spasmodic. Ford with a staff of Chinese gardeners under him, whom he could personally train, was able to organise collecting expeditions with much greater thoroughness.

In 1883 he and the Rev. E. Faber explored the Lo-fou-shan mountains, a few miles north of the East River, which were celebrated for the richness of their flora. They took with them a number of their native gardeners, and in a week or two were able to transport more than 850 living plants to the Botanic Gardens as well as collect specimens of more than 320 species.

Year after year Ford was able to gain a better knowledge of the flora within a hundred or so miles of Hongkong. As the skill of his native collectors increased, so he relied more and more on their actual work in the field. He undoubtedly employed several highly trained men, thus instituting a practice that afterwards became a definite part of the collecting technique of George Forrest and Joseph Rock.

During this period western China was always penetrated by way of the Yangtze, and Chungking became the natural jumping-off place. Luckily there were a succession of British consuls there who were actually plant collectors themselves or, at any rate, were sympathetic to botanical exploration.

After Baber came E. H. Parker who was consul at Chungking from April 1880 to December, 1881. He found time to make a number of small expeditions in the neighbourhood and collected many plants. Later he was consul at Wenchow and again in Korea. In 1892 he made a long journey through Annam, and later in the same year was appointed adviser on Chinese affairs to the government of Burma.

Then came Sir Alexander Hosie to whom we owe so much for our knowledge of Chinese economic plants. He journeyed extensively through Kweichow, Szechuan and Yunnan always on the look-out for something useful. He was a thorough and very capable observer.

One of his main reports was on the Chinese Insect White Wax. This was produced by a scale insect and at one time formed a large and extraordinary industry. These insects were bred on *Ligustrum lucidum* in the Chien-chen valley in the western half of the great Yangtze bend. At a certain season they were collected, tied in paper parcels of about a pound in weight and taken by coolies in loads of 60 pounds two hundred or more miles to the north-east in the neighbourhood of Chia-ting which itself lies about 150 miles due west of Chungking. There the insects are let loose on pollarded trees of *Fraxinus chinensis* about May. In a short while it looked as if the under sides of the branches were covered with a thin coating of snow. In a hundred days the coating was a quarter of an inch thick. The branches were then lopped off for the removal of the wax.

In its heyday more than 10,000 coolies were employed in carrying the wax insects from Chien-chang to Chia-ting; this means that about 600,000 pounds of insects were carried. In a good year each pound of scales would produce about $4\frac{1}{2}$ to 5 pounds of white wax.

Thus in one neighbourhood alone more than a thousand tons of wax was produced by an insect not very far removed from the mealy bug, that pest of our vineries.

After Hosie came F. S. A. Bourne, another enthusiastic observer and collector of economic plants. He succeeded Hosie

at Chungking in December, 1884, and was there until 1887. He made one interesting journey, first of all by the usual route to Yunnan-fu, but then he struck southwards to Szemao and Mengtze on the southern border of Yunnan. His speciality was Chinese vegetables.

The final British collector dealt with in this transition period between the war of 1860 and the arrival of the professional collector in the person of E. H. Wilson was the greatest of them all, Dr. Augustine Henry.

Henry was born in Ireland in 1856. After graduating in Queen's University he went to Edinburgh to take his medical degree. He then entered the Chinese Maritime Customs in 1881 and for a year was stationed at Shanghai. From there he was sent to Ichang as assistant medical officer where he remained from 1882 to 1889.

At the start he made no pretence of being a botanist. All the study he had had in that subject was for the knowledge necessary to obtain his medical degree. Indeed, in a letter written from Ichang he admitted that he took to collecting plants from sheer boredom: "Oh, if you knew the weariness of the exile's life. I have become a great collector of plants, and after exhausting the neighbourhood I thought of going into the mountains, so I spent six months in two journeys into the interior." He did not start collecting until he had been three years at Ichang.

Owing to his duties Henry was never able to go far from Ichang except on long leave, but there was plenty to keep him busy in the famous gorges and the low hills in the immediate neighbourhood. During his six months' leave he travelled both south of the Yangtze in Szechuan, and north in Hupeh where he wandered among those jagged limestone hills up to 10,000 feet and deep valleys as far as the Szechuan border. Fourteen years later Wilson followed his footsteps and collected seed of many of the trees and shrubs first found there by Henry.

Although Henry rarely went far afield himself, he took a leaf out of Ford's book and used extensively one or two

natives whom he had trained as collectors. One of them played an excellent joke on Kew.

Henry's first collection from Hupeh arrived there in 1886 and was joyfully received by Hemsley and Thistleton Dyer who began to realise what a vast field of botanical exploration remained to be discovered in the far west of China. One of the specimens in this collection caused great excitement and was named and described by Daniel Oliver in the *Icones Plantarum* of 1888 as the type of a new genus, *Actinotinus sinensis*, with a large flower like a *Viburnum* and a digitate leaf exactly like that of an *Aesculus*. In the next volume of the *Icones* Oliver had to write: "*Actinotinus sinensis* proves to be based upon a trick played us by Dr. Henry's Chinese collector. It is made up of the inflorescence of a *Viburnum* inserted artfully into the terminal bud of *Aesculus chinensis*."

In 1889 Henry went to Hainan Island, but he had only been there for three months before he returned to England on long leave. On his return to China in 1891 he gave up all medical duties and became an official of the Customs Department. In 1892 he was sent to Formosa where he again made large collections. He was also instrumental in saving a shipwrecked British crew from the attentions of one of the wildest of the native tribes.

In 1896 Sir Robert Hart again transferred him, this time to Mengtze in Southern Yunnan, one of the customs "ports" of entry from French Indo-China. There he had virgin territory in which to work except for a few plants collected a year or two before by William Hancock, another customs official. Although this was far south and the flora was semi-tropical, yet it was extremely wealthy. Mengtze lies on a plateau about 4500 feet surrounded by mountains and not very far from the great range near the Tongking boundary that forms the watershed between the Red and Black Rivers, a range with a magnificent flora.

Here he was again lucky in finding a pony boy who was interested in collecting. When he could not go himself, this

boy went far and wide. By this time Henry's attention was much taken up with the problem of the numerous non-Chinese tribes that in time long past had been driven into the south and south-west of Yunnan. He was particularly interested in the Lolos, who had a peculiar written language, and spent days in trying to find a Lolo who could transcribe it for him into Chinese.

In 1898 he was again transferred to Szemao farther to the west, a very wild place only 50 miles west of the River Mekong. He left China for good in 1900. In Szemao he was able to collect very little owing to the Boxer troubles and some local rebellions.

Augustine Henry at this period of his life was only interested in botanical collecting of herbarium material. He computed that by the time he had left, he had equalled Delavay's then record and had collected over 5000 different species. Hemsley stated that in the first collection he collected near Ichang and in Hupeh close on 500 new species, and no fewer than 23 new genera out of a total of 2500 species. That gives some idea of the extraordinary floral wealth of that district.

Henry did not introduce very much himself into cultivation, but among seed which he sent home were one or two important plants, such as *Lilium Henryi* and *Hypericum patulum* var. *Henryi*. He was also the first to introduce in 1889 that fine Lily which used to be called *Lilium centifolium*, and is now named *L. leucanthum* var. *centifolium*. Many of his finest discoveries were introduced later by Wilson. Among the well-known garden plants are *Acer Henryi*, *Deinanthæ coerulea*, *Deutzia discolor*, *Emmenopterys Henryi*, *Rhododendron auriculatum* and *R. Augustinii*, *Ribes Henryi*, *Viburnum Henryi* and *V. rhytidophyllum*.

Those who know the great work on *The Trees of Great Britain and Ireland* that Henry wrote with Elwes after his return home will recognise that he was a most interesting writer with a vivid power of description. Although letters were published in the *Kew Bulletin* describing his life in

Mengtze and Szemao, yet little exists on Hupeh, the part of the country of most interest to gardeners.

One extract of a letter can be given which only makes us sorry that he did not give us a full description of his life at Ichang: "Years ago the whole range was covered with dense forests of pine, which now only exist in places here and there, for the wretched agriculturist, and the miserable being who plants potatoes and opium poppies high upon the range to rid his surroundings of the haunts of black bear, wild boar and other depredationists, have burnt and destroyed the forest. How melancholy these tall trees look denuded of their branches, dead poles instead of living timber, for all the world like a nightmare dream of telegraph poles gone mad and having a mass meeting."

On his retirement from China Henry devoted himself to the study of agriculture and was Professor of Forestry at Dublin from 1913-1926. He lived to a ripe old age, and only died in 1930.

2

The Great French Missionaries

From the earliest days of Christian infiltration into China the French seem to have been the real driving force among the various European nationalities. It is hoped that some day will be written the epic of the unselfish work of their missionaries among an unappreciative people; for it will be an epic, a tale of unquestioning and uncomplaining hardship and toil that must be difficult to equal in the world's history.

Those who know the intense loneliness of the hills of the Tibetan Marches and northern Yunnan will realise what it must have been like fifty years and more ago, when travellers did not exist and communications were slow and precarious.

A. E. Pratt, the English traveller, recounts how beyond Tatsien-lu he came across Père Jeridot, "who seemed from his





emaciated appearance to have led a life of great privation. With the exception of the Fathers here, he had not seen a European for thirteen years." He mentioned that Mgr. Biet, the Roman Catholic Bishop at Tatsien-lu, told him of another missionary on the border between Szechuan and Yunnan who had not seen a European for thirty years with the exception of another brother missionary at long intervals. Can self-sacrifice lead one farther ?

France has always been better served by her explorers and collectors abroad than by her botanists at home. A few years ago there was case after case of herbarium material lying unopened in the storerooms of the Museum d'Histoire Naturelle and the Jardins Botaniques. The few competent botanists were so snowed under year after year that the work of determining this material always showed a tremendous time lag.

Unfortunately this had been going on for many years. Franchet, perhaps the greatest systematist that France has ever possessed, did his best with an amazing amount of labour; but even he was quite unable to make up lost time. As early as 1858 Mgr. Paul Hubert Perny (1818-1907) of the Missions Etrangères sent home from Kweichow a collection of several thousand dried specimens, the first to have been made in that province. When he himself returned to France in 1867, he found that nothing had been done, and, far worse, many of his specimens had been lost. When Franchet came to work on Perny's plants about 1884, he found that only 264 species remained.

Perny was more of an entomologist and zoologist than botanist: one of his main interests was the cultivation of the silkworm. Yet he collected many interesting plants, among them that fine Holly, *Ilex Pernyi*.

The same complaint of slackness of the herbarium staff was made by Gabriel Eugène Simon, one of the few important French collectors who was a layman. He was an agricultural botanist of repute, who had travelled in various parts of Africa and Asia on behalf of the French government. He

P.H.C.

H

arrived in China to find the war of 1860 just under way, but was able to carry out some coastal exploration. In 1862 he was on the borders of Manchuria and also in Japan. In 1863 he made an extensive journey through Anhui, Hupeh, Hunan and Szechuan. Simon had sent both dried and living material home each year. Most of his plants grown in the gardens of the museum in Paris were wrongly named. As most of them have long since disappeared, it is difficult to find out exactly what he did introduce. It is certain that he was the first to send home the well-known Privet, *Ligustrum Quihoui*. Here again Franchet found that much of the dried material was missing. Only 281 species survived out of the sendings of three years. Even more annoying, every single label of the collector had been removed and a printed one added instead, giving no information whatsoever.

Père Jean Pierre Armand David (1826-1900) was one of the finest naturalists that spent the best years of their life in China. Like Simon he arrived in China just after the war of 1860, and so in a way had a clear field in which to work a country whose natural history was practically unknown. Yet, if David was lucky in finding an enormous empty canvas where there was no need to superimpose on the work of others or correct their mistakes, China was equally fortunate in having at hand a man with an immense perception, a really profound knowledge, and a calm, unprejudiced judgment. David was an indefatigable worker to paint in the groundwork of China's natural history.

In describing David's work it is necessary to generalise; he was completely at home in almost every branch of natural history. His ethnographical notes were excellent; he was extremely accurate in his geographical and hydrographical observations; he was an excellent geologist and mineralogist; he was one of the finest zoologists that China has ever seen; as a plant collector he was first class. Withal he seems to have been a charming man, unassuming and afraid of parading his astounding knowledge, always asking questions, and so full of the desire to learn that some of his co-missionaries, who

may have been excellent at their work but were not filled with David's unquenchable desire for knowledge, looked at him a little askance and considered that he had a bee in his bonnet. Some were prepared to humour him by aiding him in his collections, but most in their hearts believed that such zeal for natural history was unbecoming to the Church.

Probably through his long absences in the interior of China his various reports and descriptions of his journeys printed both in China and France have suffered more from printers' errors than most scientific works. Towards the end of his life he bewailed the fact that he could not have them reprinted in correct form with all errors eliminated and the entire works re-edited by himself; but that was not to be.

David made three great journeys of exploration. The first to Mongolia, is of little importance botanically. The second, which lasted for more than two years, from 1868 to 1870, is of the very greatest importance, as it was really the first scientific journey through the great alps that border Tibet. It opened the eyes of botanists and gardeners to the marvellous flora of the Tibetan Marches. From Peking he went to Chungking on the Yangtze, from there to Chengtu, the capital of Szechuan, and then on February 22nd, 1869, to Mupin, the small semi-independent state on the Tibetan borders, inhabited by the Mantze, the remnant of one of the aboriginal tribes.

In Mupin David made his headquarters in the small seminary run by the Missions Etrangères under a young missionary, M. Dugrité. This was an example of the curious anomalies that spring up when dealing with European contacts with China. For many years this mission had stations in Szechuan, but about the beginning of the nineteenth century persecution became so rabid that the missionaries had had to take shelter with the Mantze prince at Mupin, and there they had had a station ever since, hidden away in that far corner while China became more and more anti-European.

David remained in Mupin from February until August,

long enough to find many of the plants afterwards introduced by Wilson but not long enough to collect the seed harvest himself.

The main area of his search was the mountain mass called Hong-shantin that reached a height of more than 15,000 feet. Up to 9000 feet the slopes are heavily wooded, mostly Conifers interspersed with Rhododendrons which abound on the range. David found no less than sixteen species in that one small area. At 6000 feet he found his first plant of the Dove Tree, *Davidia involucrata*.

David was an ill man when he returned to Chengtu. Like so many scientists he was more interested in the herbarium than the garden.

The number of plants of first-class garden importance which he found in those short six months is quite astounding: *Davidia involucrata*, *Cotoneaster salicifolia*, *Stranvaesia Davidiana*, *Viburnum Davidii*, *Rhododendron calophytum*, *Rh. Davidii*, *Rh. decorum*, *Rh. moupinense*, *Rh. strigillosum*, *Primula heucheraefolia*, *Lilium Davidii* and *L. Duchartrei* are a few of the plants he found at Mupin.

His third journey lasted from 1872-1874 with a good deal of time wasted by ill-health which ultimately forced him to retire to France. This was through the more central provinces of China, with less of botanical interest except his exploration of the Tsin-ling Mountains not far from Sian-fu, the capital of Shensi.

David was one of the first botanical collectors to specialise in one district. Previously most travellers had been satisfied to journey through areas without pausing more than a day or two in any particularly favourable spot. This was a pity, as it meant that for many years large areas of the country were very superficially explored, and the work sooner or later had to be re-done. On the Tibetan Marches David had very wisely settled in one district, the principality of Mupin, and worked it thoroughly. The results were far more valuable than if he had rushed up and down the frontier.

He worked on the same principle in the Tsin-ling Moun-

tains. He worked his way up the Lau-yu valley, south-west of of Sian-fu, to a village called In-kia-po, about 4500 feet, which he made his headquarters for two months. As it was in the winter, he paid more attention to zoology and collected a few plants.

Later on in 1873 he travelled extensively in Kiangsi, mostly in the hills between Kien-chang-fu and the Fukien border, a woody district and fertile range of the same character as those in the Tea districts explored thirty years before by Fortune. David again fell ill and only just managed to reach Shanghai. He sailed to France in 1874 and never returned to China.

While David only introduced a few plants to cultivation, mostly from near Peking, among them *Clematis Davidiana*, his travels were sufficiently wide to allow a man of his acute perception to have a well-thought-out idea of the general flora of China. His phyto-geographical groupings of the flora of Eastern Asia differs little from the best modern ideas on the subject. While his main interest was probably in zoology, botany ran a close second. He certainly laid a foundation to our knowledge of the flora of China; and laid the foundation well. In all he collected specimens which were sent back to France of more than 2000 species of plants. Franchet in his introduction to *Plantae Davidiana* wrote that David was extremely unlucky in one way and another; so much so that he estimated that more than half David's specimens had been lost, including 1000 specimens when his boat was wrecked on the Han River.

If Père David was the more important botanical collector owing to the amount of ground he covered and his wider knowledge of the problems of the flora of China, Père Jean Marie Delavay (1834-1895) was undoubtedly the most systematic and thorough of all the French missionaries who collected plants. He belonged to the same Missions Etrangères.

At the beginning of his career in China he was stationed at Hui-chou, east of Canton. This was in 1867. As he showed an interest in plants, he was at once encouraged by the indefatigable Hance to become one of his collectors. Unfortunately

on a holiday in France Delavay met David, who persuaded him to send his plants in future to Paris. Unfortunately is used deliberately. Delavay's collections were so immense that they were too large for the Paris museum. Fifty years after their collection many remain unexamined.

Franchet estimated that Delavay had sent more than 200,000 specimens, in all more than 4000 species of which 1500 were new; these numbers are enormous.

If that were not sufficient, Franchet, who saw more herbarium material than most of the botanists of his day, said that Delavay's specimens were the best and the neatest that he had ever seen, really beautiful bits of work showing care and method beyond the ordinary. In addition, Delavay's field notes were the clearest and most detailed.

Finally, it must be remembered that Delavay was not a collector who regularly employed natives to do the work for him. Most of these 200,000 specimens were collected and dried by him single handed. It must surely be impossible for any other collector to have surpassed this remarkable feat. His thoroughness was beyond reproach. He was lucky in living for ten years in the hills to the north-east of Tali-fu, between it and Lichiang, one of the finest plant areas in that remarkable country of north-west Yunnan. He was thus able to visit definite localities time and again until he had collected each plant both in flower and in fruit. Near his residence was a mountain called Tsemei-shan, which he called at the same time his garden and the Mont Blanc of Yunnan. This he climbed from every angle and at every season of the year, no fewer than sixty times in the ten years of his stay.

Most of Delavay's collecting was done in the area between Tali and Lichiang and north-west of Tali. He never crossed the Mekong on a collecting trip, and it is doubtful if he personally collected any plants on the north side of the Yangtze. But the area in which he lived for these ten years was quite large enough for one man to cover thoroughly. One must remember that he was first of all a missionary. Plant collecting was only a side line of secondary importance.

In 1886 bubonic plague ravaged Yunnan. Unfortunately he caught it and never completely recovered his health. In 1891 he left China for a holiday in Europe and shortly after became paralysed in his left arm.

Quite undaunted he returned to China in 1893. He was stationed for a few months at Longki in a much damper and hotter climate. He was able to collect 750 species there before ill health made him leave such an unhealthy climate. He went to Yunnan-fu. In the few months before his death on December 30th, 1895, he again collected a further 800 species. He was game to the last.

An early photograph shows an upstanding head with a broad brow. He had a long, sharp, sensitive nose with rather deep-set dark eyes and prominent eyebrows. For many years he affected one of those short beards completely encircling the chin.

In every way Delavay was a remarkable man. He was so long immured in the wilds of Yunnan that he had few friends, but his letters speak for him, full of acute observations and details of the country and its plants, with a kind word for everybody and never a grumble. As somebody wrote to the museum in Paris, "Collectors of plants could not take a better model."

Delavay recognised the garden value of some of his finds more than most collectors of this period. When possible he sent home seed of those which he thought would make good garden plants. The sendings over a few years are as follows:

					To Serres	To the <i>Ecole de Botanique</i>
1884	-	-	-	-	—	16 species
1885	-	-	-	-	17 species	9 "
1886	-	-	-	-	13 "	67 "
1887	-	-	-	-	29 "	1 "
1888	-	-	-	-	21 "	103 "
1889	-	-	-	-	28 "	24 "
1890	-	-	-	-	— "	23 "

In all 243 to the outdoor garden (l'Ecole de Botanique) and 108 to the glasshouses (Serres), of the Museum d'Histoire Naturelle.

It is more than unfortunate that at that time hardy plants were consistently badly grown in French botanic gardens, perhaps no worse than in our own, but more important in this case, as Delavay was working in an area full of plants of the greatest garden importance. The trouble was that they were almost always treated as hothouse subjects and grown in far too great heat.

It is quite impossible to give more than a small percentage of the names of the plants he discovered. Those with an asterisk he also introduced. This short list is given, as it shows how much the modern garden flora owes to Western Yunnan.

Thalictrum dipterocarpum.

Paeonia Delavayi.

Magnolia Delavayi.

Meconopsis betonicifolia.

Geranium napuligerum.

**Deutzia discolor.*

**Aster Delavayi.*

**Rhododendron ciliicalyx.*

Rhododendron fastigiatum.

**Rhododendron irroratum.*

**Rhododendron racemosum.*

Rhododendron yunnanense.

**Primula Forbesii.*

Primula malacoides.

Primula nutans.

**Primula Poissonii.*

Omphalogramma vincaeflora.

**Osmanthus Delavayi.*

**Incarvillea Delavayi.*

Lilium ochraceum.

Nomocharis pardanthina.

It is lucky that these French missionary collectors never overlapped in their districts. A little later than Delavay came Paul Guillaume Farges (1844-1912). He came to China about the same time as Delavay in 1867, but nothing is heard of his botanical prowess until about 1892 he was stationed at Cheng-kou in north-east Szechuan almost on the borders of Shensi, an area quite untouched and extremely poverty stricken. We hear of Farges being an exceedingly fine missionary as well as plant collector, and he did magnificent work in organising relief among the miserably poor inhabitants of his area.

From 1892 to 1903 when he left the mountains for Chungking, he collected almost 4000 species. His area included the Ta-pa-shan where Wilson afterwards collected many of the plants discovered by Farges. This area of hills is not quite so rich botanically as north-west Yunnan, but it is much more isolated and contained a more individual flora. Trees and shrubs are particularly plentiful.

Farges was lucky in collecting a few of the best of our Rhododendrons, *Rh. discolor*, *Rh. Fargesii* and *Rh. sutchuenense*. He also found *Carrierea calycina*, *Lilium giganteum* var. *yunnanense* and introduced *Incarvillea grandiflora*, even finer than *I. Delavayi*, and that curious and handsome shrub that bears his own name, *Decaisnea Fargesii*, with its long pinnate foliage and blue fruits.

At Chungking Farges became almoner to the hospital and completely gave up collecting. He died in 1912.

The last of the great French missionary collectors of western China was Jean André Soulié (1858-1905). He was also one of the most remarkable. He arrived in 1886 at Tatsien-lu, as always the starting-off place for the political no-man's land that lies between China and Tibet. His sole interest, apart from his medical and missionary work, was botany. He collected round Tatsien-lu, including the high peak to the north-west that is designated by several names, Jerrikou, Chraika and Jarra among them. In 1891 he was transferred to Dango, nearer Tibet. By that time he was so fluent in the frontier dialects that he was able to pass as a

native. His appearance also helped him, as he had rather a Mongolian caste of countenance with high cheek bones. Shortly after his arrival at Dango he disguised himself as a merchant and made an expedition towards Tibet, reaching as far as Tseku. This was made over tracks so little known and so high that for once in his life he was unable to chart his route with the help of the compass, so bad was the weather and so deep the snow.

A little later he was again transferred to Yaregong where he became extremely popular both with the monks and the general populace. He was a skilled physician and became known far and wide as a healer. Wherever he went on horseback he always carried a vasculum and collected specimens. These were shipped home to the Museum of Botany in Paris; in ten years he collected more than 7000 specimens, all from high altitudes on the Tibetan Marches. Among them are a number of plants bearing his name, *Rhododendron Souliéi*, *Primula Souliéi*, *Nomocharis Souliéi*. He was the first to find other well-known plants, introduced later by other collectors, such as *Rhododendron ramosissimum* and *Nomocharis saluenensis*.

Living so far afield and so completely in the back of beyond he did not get much chance of sending home seed. But one plant he did introduce which has had a great influence on our gardening, *Buddleia variabilis*.

In the spring of 1905 Soulié was warned by the red lamas of the district that trouble was brewing between China and Tibet. He did his best to pack up and despatch his year's collections, but before he could get them and himself to safety he was caught by the Tibetan monks of Batang, tortured for fifteen days and finally shot, a tragic end to a fine man and a brilliant plant collector. Yaregong being on the Tibetan border, was always a dangerous place and a hotbed of trouble between the Chinese and Tibetans. Soulié's collaborator, Bourdonnec, was wounded by poisoned arrows and then beheaded only a few months after Soulié's murder. Their successor, Monbeig, was also murdered in 1914.

.. The trouble between the Chinese and Tibetans (and incidentally the British who had disturbed the Lama world owing to Colonel Younghusband's Lhasa expedition of 1904) spread far and wide during the spring and early summer of 1905. George Forrest at that time was collecting round Tseku on the west bank of the Mekong about 28°N. He had been greatly assisted by Père Dubernard, one of the oldest of the French missionaries. Père Bourdonnec, who had escaped from Yaregong, was with them. They in turn had to flee at a moment's notice, Forrest luckily escaped, but both Dubernard and Bourdonnec were murdered. Dubernard was interested in flowers and able to help Forrest, as well as collect plants, for the Paris Herbarium. *Primula Dubernardiana*, was called after him.

One of the most remarkable, though least known from the horticultural standpoint, of these French missionaries was Père Urbain Faurie (1847-1915). His period of service in the East was spent entirely in Japan and the neighbouring islands. But the list of places in which he collected plants is remarkable, stretching from Formosa to Sakhalien. His main centre was, of course, Japan, and there were few of its mountains that he had not climbed. While he was on a collecting trip he was one of the most thorough of all botanists, thinking nothing of getting up twice a night to change the drying paper in his presses. In all he collected about 22,500 specimens between 1889 and 1913, but he seems to have done little to introduce plants, and so horticulturally is unimportant. His work in Formosa was done during two periods, 1901 and 1913. He remained in the island till his death in 1915. Even at the age of sixty-eight he wandered about dressed as a native and almost always unaccompanied.

Finally among these remarkable Frenchmen must be mentioned Prince Henri d'Orleans. Among gardeners his name is almost unknown, as he only collected a few plants as dried specimens, and, as far as is known, introduced none. But he was one of the most remarkable Asiatic travellers that the world has ever seen. He made two journeys. In both of

them by far the greater proportion was through entirely unknown country.

Prince Henri, who was born in 1867, was the second son of Robert, Duc de Chartres, and therefore a grandson of Louis Philippe. With remarkable energy considering his upbringing, when only twenty-two he started off to explore central Asia. Luckily he had with him an experienced traveller in the Pamirs, M. Gabriel Bonvalot, and was joined in Siberia by a Belgian missionary, Père de Deken. Starting from Siberia in the hopes of reaching Lhasa across the roof of the world, they crossed the Tian-shan range, went southwards through Chinese Turkestan by way of that curious desiccated lake now called Lop Nor, climbed the ranges to the south of Turkestan, crossed the plateau of north Tibet, that windswept horror where few beasts and fewer plants can live, only to be stopped by the Tibetans when 35 miles from Lhasa, an infuriating end after such a fine performance. They were, however, allowed to travel eastwards, and took the main road to China by way of Batang and Litang to Tatsien-lu. There they met Père Soulié and A. E. Pratt.

Bonvalot was not interested in botany, but when travelling became a trifle more civilised Prince Henri collected what he found in flower, principally between Batang and Tatsien-lu. He left his collections with Pratt who took them with him to Shanghai. Prince Henri was the first to discover several important garden plants, among them *Meconopsis chelidoniifolia*, *Rhododendron yanthinum*, *Primula vittata* and *Incarvillea grandiflora* introduced a few years later by Père Farges.

From Tatsien-lu the travellers went to Yunnan-fu, then down the Red River to Hanoi.

In 1895 Prince Henri started his second expedition, from our point of view more important than the first, although he collected far fewer plants. This time, with two companions, Lieut. Roux and M. Briffaud, he started from Hanoi, ascended the Red River, struck westwards across southern Yunnan, at that time completely unknown, until he reached the river Mekong. They followed the Mekong valley northwards until

opposite Tali-fu, which they visited. After a rest of a few weeks they returned to the Mekong valley and zigzagged between it and the neighbouring Salween valley until they reached the missionary station of Tseku on the right bank of the Mekong. This was the farthest point reached by Cooper on his attempted journey from Yunnan to Burma in 1868.

Again the Prince and his companions struck westwards with a touch of south in it across the frontier range between Yunnan and Burma, across the two main divisions of the Irrawaddy, the N'mai Hka and the Mali Hka, to Hkamti in Upper Burma, later to be called Fort Hertz. From there they went north-westwards, up the Namtamai valley and finished up in Sadiya in Assam, where they arrived on Christmas Day, 1895. In forty-five weeks they had travelled 2100 miles, of which 1600 was at that time completely unexplored.

So fast and so light did they travel that no collections of natural history were made. But they were the first to make known the great hills and valleys of the very top of Burma, the country so thoroughly worked over later by Kingdon Ward and Farrer on the Burmese side and George Forrest in the Mekong and Salween valleys. The Prince's lecture before the Geographical Society in 1896 and his book *From Tonkin to India by the Sources of the Irrawaddy* described something of an enormous unknown area of the greatest importance botanically. This journey bears comparison with that even more remarkable exploit of Griffith who many years earlier travelled alone from Sadiya through the head-hunting country lying to the south, down the Hukong valley to Ava, then the capital of Burma. Both journeys stand in the forefront of pioneer travel.

3

The Russians in north-west China

About the same time that the French missionaries were working their way towards the far west of China the Russians came in from the north. Of all European nations they were the most directly interested owing to the common boundary between China and Manchuria and Mongolia that ran for hundreds of miles. Although much of this frontier was in quite impossible country, yet from very early days there had always been sufficient trade by means of caravans to make Russia take a more personal interest in the natural history of China.

Much of the exports from China to Siberia consisted of Tea and other agricultural produce, drugs, and even skins and furs. Thus, as soon as a regular mission was stationed at Peking, a trained botanist was attached often as surgeon or doctor.

Later, when China became more amenable to foreign influence and travellers were allowed access throughout the country, it was impossible for a botanist-physician stationed at Peking to cover sufficient ground and at the same time perform his regular duties. In his stead a number of expeditions lasting over many years were organised, either directly by the Russian government or with their substantial aid both financially and with personnel. Also, there was often a slight flavour of the secret service agent about some of the personnel. Many of these expeditions began or ended in Russian Turkestan. This was at the time when the bogey of Great Britain was a Russian drive towards India. This is no place to discuss its practicability; but it is true that most of the best Russian travellers were army officers and that almost every expedition had a geographer with them.

With the active aid of their government these Russian expeditions were much more elaborate affairs than those of

other nationalities. They usually consisted of three Russians, an interpreter, often from Chinese Turkestan, who could speak Chinese and possibly a little Tibetan, and a military guard of cossacks ranging from two to fifteen men. Whatever may have been the ulterior motive behind these semi-military expeditions, they were always extremely well run and from the natural history point of view were eminently successful.

The first and greatest of these travellers was undoubtedly Nicolai Mikhailovich Przewalski. He was born in 1839 near Smolensk. After serving as an ordinary soldier he became an officer in 1856, passed the Staff College and became lecturer on history and geographer at Warsaw in 1866. In 1867 he was transferred to eastern Siberia and for two years he travelled in the Ussuri country collecting zoological and botanical specimens.

His first great journey began in 1870 and lasted until 1873. This was before he was really well known, and he had, in consequence, to pay for most of it himself. On this occasion he was accompanied by Lieutenant Pyltsov, who afterwards married his sister, and two cossacks. They crossed the frontier between Shansi and Mongolia, and then crossed the Yellow River into that curious desert called Ordos round which the river makes its enormous northward bend. By New Year's Day, 1872, they were back in Kalgan, as Przewalski's money had run out.

The Russian Minister in Peking advanced him further funds, and in June they started off again for the Koko-nor, the great lake in the very north-eastern corner of Tibet. They went by way of the Datung Alps and the Monastery of Chebson, Farrer's hunting ground during the second year of his Kansu trip in 1915. That was the area which he described in *The Rainbow Bridge*. This was also a favourite neighbourhood of Przewalski, who visited it in 1872, 1873, 1880 and 1884; it was much better zoological country than botanical, and Przewalski was an even better zoologist than botanist.

In the autumn of 1872 they reached the Koko-nor and struck due west towards Tsaidam and the desiccated country

round Lop-nor in the very centre of Asia. From there they went south in the hopes of reaching Lhasa. Early in 1873 they found themselves on the head-waters of the Murussu river in the north of Tibet; this is the river that ultimately becomes the Yangtze. Again lack of funds stopped them before they had come in contact with the lamas of Lhasa. They returned to Chebson before making their way back to Russia by way of Urga.

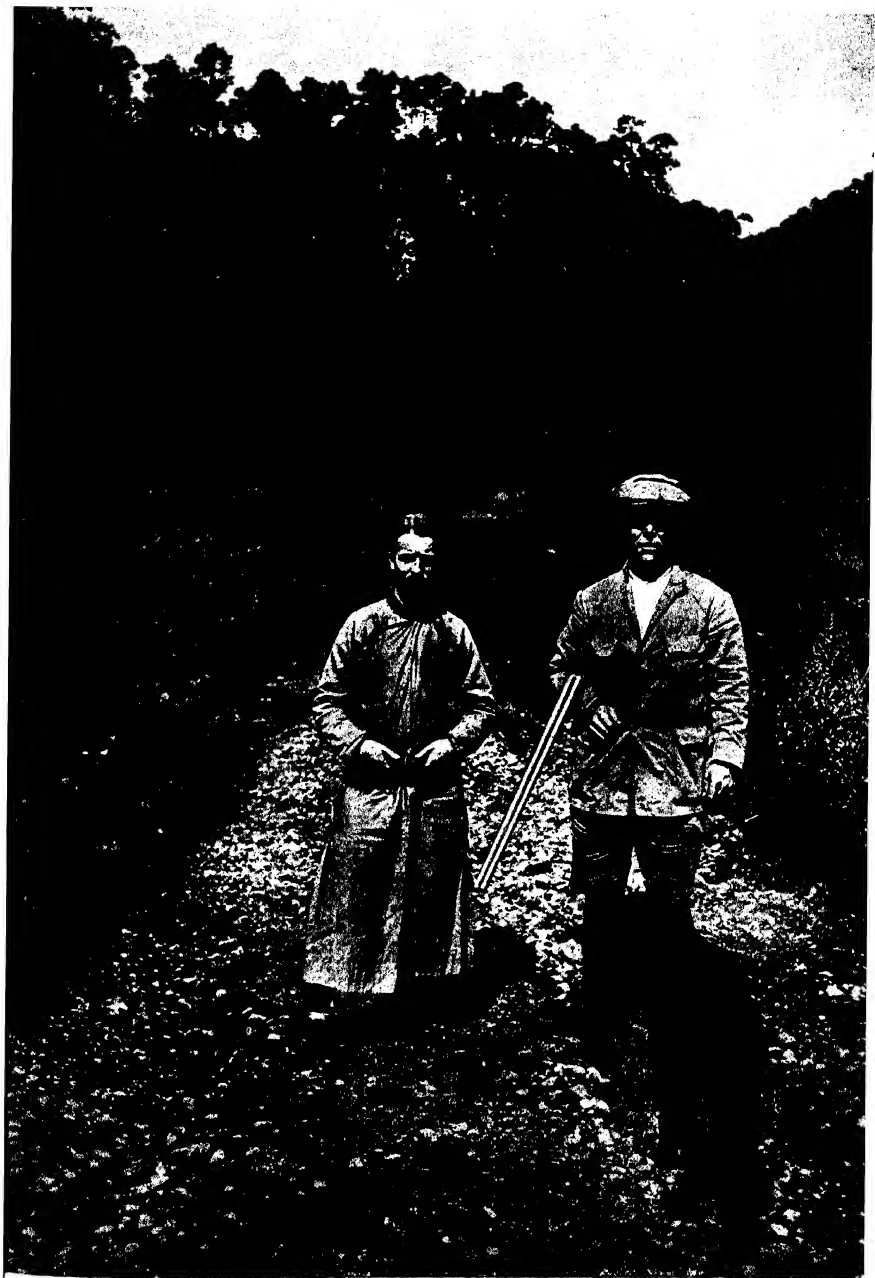
This expedition roused the imagination of the Russians. Przewalski was promoted to Lieutenant-Colonel and received a pension of 600 roubles.

The whole of the rest of his life was spent in trying to get to Lhasa. He made four more journeys, and died on the last one.

The second journey hardly concerns us: it was almost entirely in central Asia, across the Tien Shan, by way of the Tarim River, the Lop-Nor to the northern buttresses of the Tibetan plateau.

The third journey was similar, except that Przewalski came back by way of Kansu when he was again able to spend a few days in his favourite Datung Alps. On this journey they got to within 170 miles of Lhasa before they were turned back by the lamas.

The fourth journey geographically was most important. This was from 1883 to 1885. Przewalski was accompanied by Lieutenant Roborovski, P. K. Kozlov, a taxidermist, an interpreter and sixteen soldiers and cossacks. Crossing the Gobi Desert, they made for the Datung Alps early in 1884, then went through the mountains until they reached the Koko-nor. This time their immediate purpose was to explore the head waters of the Yellow River and the Murussu River (the latter is really the Upper Yangtze). These are not so far apart, and both rise in the eastern end of the Tibetan plateau. After spending two months in that district they turned north and again explored Tsaidam and the Lop-nor areas. The spring of 1885 was spent on the shores, if they can be called such, of the Lop-nor watching migratory birds.



XV—GEORGE FORREST AND ONE OF THE FRENCH MISSIONARIES



XVI—GEORGE FORREST'S CAMP IN THE LICHANG RANGE. THIS WAS ONE OF HIS BEST HUNTING GROUNDS

When Przewalski and his companions returned to Russia, the Emperor Alexander III promoted him to Major-General.

In 1888 he started off on another expedition with the same two companions, but he died of typhoid before they had left Russian Turkestan.

Of the collections made by this great traveller the zoological specimens undoubtedly came first in importance. As a rule he travelled too fast to allow sufficient time for thorough botanical work; in addition, he liked winter travel. Nevertheless his botanical finds are important. He collected in all about 1700 species in about 15,000 specimens; and it must be remembered that he was always in country comparatively unimportant from the botanical point of view. He never touched the areas of western China that have since proved so exceptionally rich in their flora.

Among the better known plants which he discovered are :

Meconopsis punicea,

M. quintuplinervia (which he also introduced).

Meconopsis integrifolia.

Geranium Pylzowianum.

Lonicera syringantha (which he also introduced).

Gentiana straminea (which he also introduced).

Daphne tangutica.

Allium cyaneum } (both introduced by him).
Allium kansuense }

Przewalski's work in Central Asia was carried on by his companion Roborovski and Captain M. V. Pevtsov.

Long before Przewalski died the Russian Government had sent out an expedition in a different direction. This was under the command of Captain Sosnovski, who was sent to China in 1874, with the express purpose of travelling through the provinces of the north-west and then seeing if he could find a new trade route across the Gobi Desert and the Tien-shan. This expedition was interesting as it was probably the first in China which had an official photographer. Although it

passed through much fine country on the way from Hankow to Lanchow the capital of Kansu by way of the Han River, through Hupeh and Shensi, the botanical collections were poorly done. They were hardly worth mentioning but for the fact that two very well-known plants were discovered on this journey, *Dipelta floribunda* and *Buddleia alternifolia*.

One of the most interesting of these Russian travellers was Grigori Nikolaevich Potanin. His father was a Siberian cossack who lived near the great Kirghis Steppe. G. N. Potanin was born in 1835 and was educated in the military school at Omsk in Siberia. While there he became acquainted with Semenov, the Russian traveller who was afterwards vice-president of the Imperial Geographical Society. Potanin longed to complete his scientific education but had no funds to take him the long journey to St. Petersburg. Luckily in 1858 he was allowed to accompany a government gold caravan from Tomsk to St. Petersburg. There his friendship with Semenov stood him in good stead, and he was able to enter the university. He joined a group who were against the government and had to return to Siberia. There he again got into serious trouble. After a period in a fortress he was sent to Nikolsk as a convict settler. In 1874 he was pardoned owing to the exertions of Semenov. In 1876 he began his series of journeys into central and eastern Asia. In them all he was accompanied by his wife, who must have been a remarkable woman.

His first two journeys do not concern us, as they were confined entirely to Mongolia, but the third and the fourth are very important. The third started from Peking in May, 1884. With Berezovski who had been in the first two expeditions and Scassi, an excellent topographer, the Potanins first of all explored Ordos and then struck farther south by way of Lanchow to the area called Amdo. This name was given by the Tanguts to the country east of the Koko-nor, the large area surrounding Sining and south-west Kansu in general. The district names in this part of the world are very loosely applied and are most confusing. This is much the same area

as that explored from 1924-1926 by J. F. Rock and called by him Tebbu-land. This is more or less the district in which most plants called by the specific name *tangutica* are found.

The expedition made their headquarters in this neighbourhood at Siku, exactly like Farrer and Purdom did thirty years later. They explored the Satani range and stayed at the village of Chago. From there they again moved south across the Szechuan border to explore the head waters of a river with the charming name of Hei Ho. Ultimately they turned up at Sung-pan in north-west Szechuan, having followed much the same route as Captain Gill. From there they returned to Lanchow by a more easterly route.

Meanwhile Berezovski had remained for the whole of the summer round Siku collecting botanical and particularly zoological specimens. He remained in this part of the country for a further year. The Potanins and Scassi returned to Siberia by way of the Koko-nor and the Mongolian desert. Potanin for several years after this was secretary of the East Siberian branch of the Imperial Geographical Society.

The fourth expedition was still farther south. Berezovski again accompanied the Potanins off and on as zoologist, Kashkarov as assistant naturalist, and Obruchev, a young mining engineer, went with them as geologist. From Peking they crossed the Tsinling range and worked their way down through Shensi and Szechuan to Chengtu the capital. There they caught up with Berezovski who had started out almost a year earlier.

Berezovski again went off on his own and the rest went by Mount Omei to Tatsien-lu. From there Kashkarov went on to Batang. After three months in Tatsien-lu the Potanins left for the Yangtze owing to Mme Potanin's ill-health. She died two days before reaching Chungking.

This journey has been sketched in very lightly as later explorers collected much more thoroughly in these areas. Potanin collected vast quantities of specimens and also many seeds; 12,000 specimens of possibly 4000 plants in the third and 10,000 specimens of probably 1000 species in the fourth

journey; but Maximowicz, the greatest Russian botanist, who was working out Potanin's plants, died in 1891. The consequence is that much of Potanin's work is still unpublished. He was certainly a fine traveller and a magnificent collector. His visit to Mount Omei and Tatsien-lu took place in April and May to July respectively, a little too early for plants in the high ranges, and certainly too early for seed. Otherwise he must have collected many plants which were afterwards introduced by E. H. Wilson and others.

Potanin has, however, some fine plants to his credit: among them *Viburnum betulifolium*, *Larix Potaninii*, *Gentiana hexaphylla*, while his companion Berzovski found and introduced *Arundinaria nitida* from south-west Kansu, possibly one of the best plant importations from China.

There were a number of other Russians about the same period, including two brothers with the fascinating name of Grum Grjimaïlo, but none were of much importance.

Finally we come to one of the greatest names in the botany of China, Emil Bretschneider. He is chiefly famous as one of the finest historians of the botany of a country that the world has ever seen. His knowledge of the botanical exploration of China prior to 1900 and of the taxonomy of China was quite unrivalled.

He was stationed at Peking as physician to the Russian Legation from 1866 to 1883 with only two periods of absence. His historical researches have been mentioned in the introduction. As a plant collector he was nothing out of the way; he travelled extensively in northern Chihli, that is in the neighbourhood of Peking, but collected no farther afield than Jehol. It is unfortunate that the flora of Chihli is not richer, for Bretschneider was unique in his day: he collected plants primarily with the idea that they should be of value in gardens in Europe and America. He wrote: "But in visiting the mountain regions of the Peking prefecture, and at different seasons, my chief object in view was to procure ripe seeds of interesting plants unknown in Europe, especially trees and shrubs and economic plants, which I transmitted for cultiva-

tion to several of the great botanical and horticultural institutions in Europe and North America, where many of these plants are now successfully cultivated."

He went on to say that the best results had obviously been obtained by the Jardin des Plantes at Paris and the Arnold Arboretum. After Dr. Hance his greatest English-speaking friend was certainly Professor Sargent.

Although Bretschneider wrote rather apologetically of the flora of the country round Peking, yet he was able to introduce to horticulture a number of fine plants, such as *Celastrus articulatus*, *Rhododendron mucronulatum* and *Syringa villosa*.

CHAPTER V

THE WILSON ERA

I

A. E. Pratt

THIS chapter is headed *The Wilson Era*. It may seem odd, therefore, to begin by describing the work of a man who collected in China twelve years before Wilson, whose prime interest was zoology and entomology, not botany, and who is little remembered to-day.

Yet the work of Antwerp E. Pratt definitely opens a new era in the exploration of the natural history of China; he was the first of a new line of professional and amateur collectors who had no fixed interest in China. What is remarkable is the length of time that elapsed between the opening of the interior of China and the arrival there of the professional collector. To most collectors before 1890, collecting was only a by-product of their activities; they all belonged either to one or other of the missionary bodies or to some government service.

So short a time ago as 1887, when Pratt left England for China, so little knowledge of the far west of China had reached the outside world that even Pratt had little or no idea of what he was going to see. He begins the account of his journeys, *To the Snows of Tibet through China*, with the following sentence: "So little of this great world of ours is new to the explorer or naturalist, that it becomes more difficult year by year to find unworked fields. Choice is therefore mainly confined to those which have hitherto been only superficially examined." This presupposes that most of the Tibetan marches had been explored previously by Europeans, a very obvious mistake.

Nevertheless credit must be given to Pratt for having the imagination to set out from England with the sole purpose of exploring in the far west of China. He was one of the first Europeans to have this imagination. And so he is a definite connecting link between officials, like Augustine Henry, along with missionaries like Père Soulié and the professional collectors of our century in the shape of E. H. Wilson and George Forrest.

On one other point did Pratt and Wilson have a very definite affinity: Wilson followed Pratt's footsteps in a remarkable fashion, not with any intent to copy, for of course Wilson moved much farther afield than Pratt, but because Pratt did take pains to visit some of the best centres for scientific exploration.

A. E. Pratt must be one of the most leisurely travellers that ever explored new country. He was a man of means who obviously meant to do his work thoroughly but in his own good time, else he would not have left England in 1887 in those days of comparatively slow travel with his entire family. These he left at Ichang, at that time the farthest treaty port. There he met Augustine Henry. This was lucky, as Pratt had originally no intention of collecting any botanical material, but Henry at length persuaded him to employ a Chinaman whom he had trained.

During what was left of 1887 Pratt wandered round Ichang and in the famous gorge, with a side excursion to the well-wooded hills of Chang-yang about 50 miles south of Ichang. In 1888 he was satisfied in carrying out the same procedure and spent the summer among the Chang-yang hills. As his wife was ill, he spent the winter of 1888-9 at Shanghai, but on her recovery in the spring of 1889 they returned to Ichang. Shortly after Mrs. Pratt and the family left for England. Then he set off farther afield.

He and a German, Kricheldorff, as assistant collector, had a houseboat built in which they voyaged up the Yangtze to Chungking and Suifu where they left the main river and went up the Min River as far as Kiating-fu. Thence they made

their way overland to Wa-shan, which they climbed, and by the main road to Tatsien-lu. During this trip they left their collectors behind at Wa-shan, as Pratt states definitely that the botanical collector was left in charge, but that all were well up to their work. As these collectors must have spent most of the summer at Wa-shan, afterwards thoroughly explored by Wilson, it is odd that no records exist of any plants having been collected in this neighbourhood with such an extremely rich flora.

Pratt was much impressed with the scenery as they approached Tatsien-lu: "Views up ravines disclosed snow-capped mountains, below which were forests of dark pine, and the different zones of vegetation could be distinctly traced. Just below the snow, grass was growing, and then in rotation followed pine forests, rhododendrons, mixed evergreens, and then in valleys sub-tropical plants."

On his arrival at Tatsien-lu Pratt found William Woodville Rockhill, the famous American explorer of Tibet, and also Père Soulié. Pratt made one or two short trips to the north and west of Tatsien-lu, before returning to Ichang and Hankow for the winter.

Next year he and his companion again set off for Tatsien-lu by way of Kiating-fu, but on this occasion they explored Mount Omei on the way. Pratt's observations as usual are very accurate; he noticed the peculiar Tea drunk and sold on the mountain, actually made from *Viburnum theiferum*, and was lucky to get a perfect view from the summit of this very wet hill: "Over the clouds beneath could be seen Mount Wa to the S.S.W., while to the northward of west the snowy range above and beyond Tatsien-lu could be seen clearly cut against the sky. The upper surface of the clouds appeared remarkably level, and the appearance of range after range of mountains showing above them formed a magnificent spectacle." A clear view of more than 100 miles is uncommon in spring.

On their arrival at Tatsien-lu Kricheldorff went off to Mupin, the first stranger to visit that little principality since

Père David, while Pratt again made a number of short excursions in the neighbourhood, luckily with Père Soulié as a companion. Later he moved westwards to Mosi-mien where he built a hut and remained for the summer.

This was an area of fine mixed forests of Beech, Larch and Walnut with Bamboo and quantities of Rhododendrons and Primulas. But it was also an area with a vile climate. In Pratt's diary for June 5th he wrote: "A heavy snowstorm and bitterly cold, all the bloom being cut off the Rhododendrons. Really terrible weather, and like a Canadian winter. In the evening there was a foot of snow on the ground. A coolie came in during the day with the news that the road to Tatsien-lu was blocked with snow." That snowstorm lasted until June 9th, when there was 3 feet of snow on the ground.

As so often happens, Pratt was blamed by the natives for the bad weather and had to return to Tatsien-lu in a hurry. There he met Prince Henri d'Orleans on his journey from Tibet. Pratt looked after all the Prince's specimens until he reached Hankow. On his return to Kiating-fu he again visited Mount Omei, but the weather was wet and misty during the whole ten days of his stay on the summit. Then he went on down river to Shanghai and home to England.

From our point of view it is a pity that this accomplished traveller was more interested in ornithology and entomology than in botany, otherwise he could have done more of the spade-work that Wilson had to carry out a few years later. Yet he collected a sufficient number of plants to prove the rich flora of this part of the western marches, *Berberis polyantha*, *Rhododendron Prattii*, *Primula Cockburniana*, *Gentiana trichotoma* and *Daphne retusa*, all excellent plants.

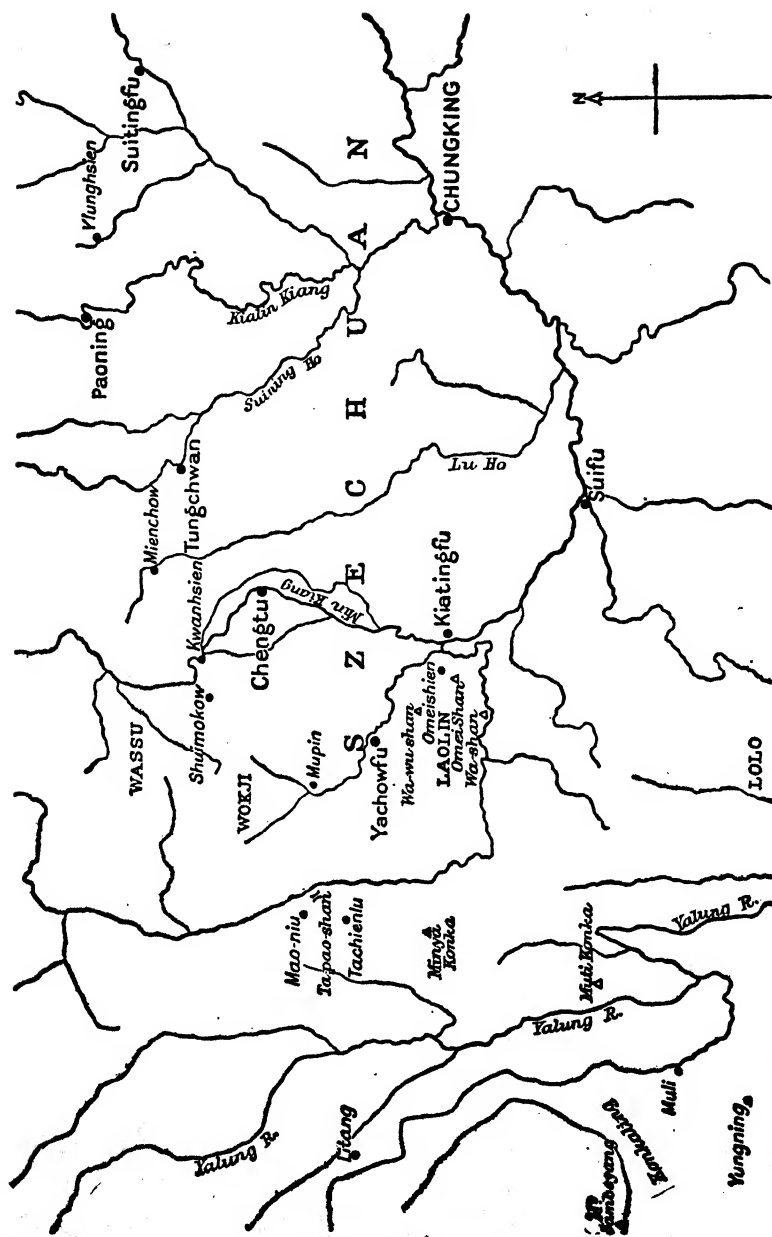
Ernest Henry Wilson

The method changes. You will note how since the start of the nineteenth century plant hunting in China has run in fairly definite grooves: officials of the East India Company who collected the best Chinese florist flowers in their gardens; collectors from Kew and the Horticultural Society who had to keep to the fringe of the seaboard owing to treaty regulations and so had to collect and send home what they could find in Chinese gardens; the French missionaries and others whose work kept them in the interior of the newly opened provinces, but whose inclination or lack of opportunity prevented them from introducing new plants to Europe, excellent though they were in collecting herbarium material; travellers like James H. Veitch and Charles Maries who rushed about from place to place, always anxious to skim the cream off the milk, but in too much of a hurry to do even that properly.

Finally we come to the expert collector who spends most of his life collecting, knows his plants, knows his job and knows his country. He works by routine, visiting an area to see what is to be seen and returning later to collect the seed harvest. He works for two masters, the botanical institution that is interested in herbarium material and the gardener who is keen to grow new plants. As a rule this kind of dual command works harmoniously and does not clash. The collector sets out with a definite object in view, covers an area that is limited in extent, and does not run haphazard over the country. Often collecting is the man's livelihood; always is it taken seriously.

Robert Fortune was born too soon. There is no doubt at all that he was of the stuff of which the greatest plant collectors are made.

Charles Maries had the opportunity but missed it. China was open wide in front of him, but from laziness and lack of



WILSON'S COUNTRY

tact he did not get on with the Chinese. After getting as far as the Ichang gorges, the gateway to the flower marvels of the western hills, he gave up and reported to the Veitchian firm that there was nothing else worth introducing from China. He must have rubbed this into the usually perspicacious Veitch, because later he was reported to have said to Wilson on his departure for the first trip in China, "My boy, stick to the one thing you are after and do not spend time and money wandering about. Probably almost every worthwhile plant in China has now been introduced into Europe."

And yet the great firm of Veitch was sufficiently wide awake to send Wilson not once but twice, the first time with the main object of introducing the Dove Tree, *Davidia involu-crata*, the second time to send home seed of the yellow *Meconopsis integrifolia*.

Ernest Henry Wilson was born in Gloucestershire in 1876. After school he entered his apprenticeship in the nurseries of Messrs. Hewitt of Solihull, lately moved to Stratford-on-Avon. In 1892 he entered the Birmingham Botanic Gardens and studied botany in the technical school. In 1897 he went to the Royal Botanic Gardens at Kew, but soon decided to take up the teaching of botany. He was on the point of entering the Imperial College of Science when the Director of Kew recommended him to James Veitch and Sons as a collector. He spent six months at their Coombe Wood nursery under their famous foreman George Harrow before sailing for China by way of the United States in April, 1899.

His first port of call was the Arnold Arboretum where he made instant friends with Professor Sargent, a factor that loomed very large in his future life. He crossed the Pacific and reached Hongkong on June 3rd. Either Wilson or James Veitch had decided very wisely that it was most important to get Augustine Henry's views and advice before starting off on his main trip. As Henry at this time was stationed at Szemao in south-western Yunnan, a sabbath day's journey from the east coast, Wilson spent the early part of the winter of 1899-1900 in visiting him and nearly had to give up owing to

sporadic trouble at Mengtze on the way there. But he persevered and not only spent a profitable month or two imbibing as much of Henry's plant lore as possible, but collecting on the way back the lovely *Jasminum primulinum*.

At Henry's suggestion he concentrated to begin with on the country round Ichang on the Yangtze in western Hupeh, where Henry had himself been stationed. It was this country and Szechuan that Wilson made particularly his own as a plant collector. Much of the neighbourhood of the Hupeh-Szechuan border consists of series upon series of carboniferous limestone ranges with deep valleys between. A very sparse population and almost non-existent means of communication make this part of the country extremely difficult of access; but it contains one of the most magnificent tree and shrub floras of the world.

Wilson was a good photographer, but he had one peculiarity; he would never travel with anything less in size than a whole-plate camera. This, I believe, he kept up through the whole of his life. The consequence was not only a great weight to be carried through some of the most difficult tracks in western China, but also the difficulty of taking photographs of plants at unusual angles.

His first investigation of the tree he set out to find, *Davidia involcrata*, is a good example of the thoroughness with which he worked. On May 31st, 1900, he wrote in his diary:

"Go over and investigate the *Davidia* trees and the forests generally. Crossing a narrow neck a woodcutter's circuitous path leads us down to a narrow defile through a fine shady wood. Ascending a precipice with difficulty, we soon reach the *Davidia* trees. There are over a score of them growing on a steep rocky declivity; they vary from 35 to 60 feet in height, and the largest is 6 feet in girth. Being in a dense wood they are bare of branches for half their height, but their presence is readily detected by the numerous white bracts which have fallen and lie strewn on the ground. The tree starts up from below when felled; indeed, it naturally throws up small stems after it gets old. The bark is dark and scales off in

small irregular flakes. By climbing a large *Tetracentron* tree growing on the edge of a cliff, and chopping off some branches to make a clear space, I manage to take some snapshots of the upper part of the *Davidia* tree in full flower. A difficult task and highly dangerous. Three of us climb the tree to different heights and haul up axe and camera from one to another by means of a rope. The wood of *Tetracentron* is brittle, and the knowledge of this does not add to one's peace of mind when sitting astride a branch about 4 inches thick with a sheer drop of a couple of hundred feet beneath. However, all went well, and we drank in the beauties of this extraordinary tree."

It is difficult from Wilson's writings to work out the exact itineraries of his various journeys. His main book on his travels, *A Naturalist in Western China*, published in the country in 1913 and re-issued in 1929 in the United States under the title, *China, Mother of Gardens*, if read in a careless fashion seems like the narrative of one consecutive journey. Actually it is made up of sections from his itineraries of 1903-1905, 1907-1908 and 1910-1911.

As Wilson has probably introduced more first-class ligneous plants to cultivation than any other individual collector some attempt has been made to describe his various journeys and a few of the important introductions at greater length than has been done previously in this volume.

As has been stated earlier, his first trip for the Veitchian firm was specifically to introduce *Davidia involucrata*. Actually in the first year, 1900, he did not move far from Ichang. That he was able to move about at all was wonderful, as this was the period of the Boxer trouble, and Hupeh and Szechuan at the best of times are not in the habit of welcoming foreigners with open arms. Even the vastly more experienced Henry in the south-west of Yunnan where Chinese influence was not so great was almost completely immobilised. Yet in those first two years Wilson did travel about, certainly as far as Henry's excursions in the immediate neighbourhood. He spent a certain amount of time on the Yangtze in these curious com-

binations between conveyance and houseboat, a not very safe form of amusement in the Gorges. Once he was actually wrecked and lost all his belongings, including his camera and hundreds of plates.

When the temper of the people had calmed down, he moved farther afield. He again followed Henry's footsteps both south and north of the Yangtze. North was far more important, for north-west Hupeh consists of an extraordinary welter of limestone hills and valleys with one of the finest floras in the world: he frequently mentions collecting specimens of twenty-five or thirty different woody plants in one day. Here is a sample description of a day's march made through the same country, but not by the exact same route, in 1910:

"The next morning we made an early start in order to cover the 60 li between Hsin-tientze and Mao-fu-lian. Immediately on leaving we traversed an old wood especially rich in species of Maple. *Davidia* and Beech are also common, whilst the interesting *Cornus sinensis* occurs sparingly as a thin tree 60 feet tall. *Pinus Armandii* is present, but Conifers generally are very scarce in this particular locality.

"We meandered around the mountain-sides, by a tortuous ascending path, until we reached a gap in the ridge and crossing over made a breakneck descent of a couple of thousand feet. A new kind of Poplar, having the young foliage bronzy-red, was common on all sides, and in the descent I gathered *Primula violodora*, *Rhododendron Augustinii*, *Acer griseum*, and a pink-flowered *Staphylea*, the last two both small trees. The most interesting find, however, was a new *Hydrangea* [*H. Sargentiana*], a shrub 5 to 6 feet tall, with stems densely felted with short bristly hairs and large, dark green leaves with a velvet lustre—in foliage alone this species is strikingly handsome."

What a collection of really first-class garden plants to see in one day.

One gathers that the Veitchian purse was not inexhaustible, and that this prevented travelling farther afield over a longer

period. Nevertheless when he returned to England in April, 1902, he brought with him from the collection of 1901 alone the seed of 305 species, herbarium material of 906 species, in addition to thirty-five cases of bulbs and living roots.

Here are some of the best-known introductions from this first expedition:

Abies Fargesii.

Acer griseum, Davidii.

Actinidia chinensis.

Astilbe Davidii.

Buddleia Davidii (variabilis) magnifica.

Clematis Armandii, montana rubens.

Cotoneaster Dammeri, Dielsiana.

Davidia involucrata.

Dipelta floribunda.

Magnolia Delavayi.

Malus theifera.

Potentilla fruticosa, Veitchii.

Rhododendron discolor, Fargesii.

Senecio clivorum.

Stranvaesia Davidiana, undulata.

Styrax Hemsleyanum.

Viburnum rhytidophyllum.

Wilson left England again in January, 1903, for the second expedition on behalf of the firm of Veitch. This time his main object was the introduction of *Meconopsis integrifolia*. Glowing accounts of its beauty had reached home, possibly from A. E. Pratt, the naturalist who had visited Tatsien-lu a year or two before.

This time he made his headquarters far farther west at Kiating-fu in Szechuan on the Min River about halfway between the junction of the Min and the Yangtze and Chengtu, the capital of the province. This was an excellent centre and an important town. It lies just to the east of the famous Mount Omei. Communications are easy to the north through





the great Chengtu plain, one of the most highly cultivated areas of China; Mupin and the other feudal states of the Tibetan marches are not far to the west; and it lies on one of the main roads to Tibet by way of Tatsien-lu and Batang (Baan-fu).

Wilson made good use of his opportunities. In two collecting seasons he covered an enormous mileage. He went three times to Tatsien-lu, each time varying his route so as to cover more ground. He also went twice to Sungpan, the farthest town in north-west Szechuan, near the Kansu border. This was a very far cry, at least 300 miles from Kiating-fu. Here again he varied his route when in the hills. Once he very nearly starved himself and his followers to death by following an almost unknown track through terrible country in the vilest weather. It was through an almost uninhabited tract, and what inhabitants there were, were on the verge of starvation themselves owing to the bad season. Between these extraordinary rushes Wilson managed to explore Mount Omei thoroughly.

Much of these two years was spent at a much higher elevation than in western Hupeh, where the heights rarely reached 10,000 feet. This question of altitude meant that a great deal of his time was spent above the tree line, and it was on this expedition that he collected and introduced most of the herbs, which at the best were only of secondary interest to him, except Lilies. He was, however, much impressed by the sight of thousands upon thousands of plants of *Meconopsis integrifolia* and also of the scarlet *M. punicea*, which he saw both separately and together. The latter is a much more difficult plant in cultivation than its yellow brother.

With his headquarters so close at Kiating-fu, Wilson visited both Mount Omei and a neighbouring mountain called Wa-shan. These and a third hill, Wa-Wu-shan, which he climbed in 1908, form the apices of a curious triangle west of Kiating-fu. Although many miles apart, they are curiously alike with flat tops, many square miles in extent in the case of Wa-shan, and impressive cliffs, over 2000 feet high on one

P.H.C.

K

XVIII—THE FIRST PHOTOGRAPH OF THE FIRST CLUMP OF *GENTIANA SINO-ORNATA* SEEN BY FORREST IN YUNNAN. THIS WAS ONE OF HIS MOST IMPORTANT INTRODUCTIONS

side of Mount Omei. On Wa-shan the cliffs are in a series of gigantic steps, and the final three below the top have to be surmounted by ladders. Between these three mountains lies a welter of crags and gullies, such a wild stretch of country that the Chinese call it the Laolin, or Wilderness.

The climate of this triangle is extremely wet. As most of the rock is limestone, it will be understood what a wonderful flora the three mountains contain, particularly Mount Omei and Wa-shan. Mount Omei is one of the three holiest Buddhist mountains in China with temples on every picturesque vantage point and a constant stream of pilgrims from all over China and even as far afield as Nepal, climbing its 11,000 feet. Wa-Wu-shan also basks in reflected holiness. For two months of the year it has a small share of pilgrims; for the other ten it is completely neglected. Wa-shan also has a temple on its summit.

At the time of Wilson's visit (he climbed Wa-Wu-shan and crossed the Laolin in 1908) Mount Omei was well wooded, because it was a holy mountain; but both Wa-shan and Wa-Wu-shan had been more or less denuded of their big trees by the charcoal burners, the summits consisting of dense thickets of Bamboo. Nevertheless Wilson constantly mentions the numbers of the shrub flora. What is more remarkable is the fact that he states quite clearly that both Mount Omei and Wa-shan with their stupendous cliffs are formed of hard limestone, as is most of the Wilderness, and yet he found a number of Rhododendrons on them, mostly on Wa-shan. This is so contrary to the usually accepted theory that Rhododendrons will not thrive on limestone that a list of those found on Mount Omei and Wa-shan is given:

R.R. ambiguum, argyrophyllum, calophytum, concinnum, Faberi, insigne, moupinense, ochraceum, Sargentianum, Searsiae, strigillosum, villosum, Williamsianum, Wiltonii.

It is often stated that Forrest later found a number growing on hard limestone east of Tali, which only bears out that hard

limestone, either magnesian or carbonate, is not so indigestible to Rhododendrons as is commonly imagined. This question of limestone has been mentioned before in Chapter I.

Other trees and shrubs of these hills are *Acer Davidii*, *Actinidia chinensis*, *Abies Delavayi*, *Tsuga yunnanensis*, *Sorbus munda*, *Rosa omeiensis*, *Philadelphus Wilsonii*, *Cassiope selaginoides*, and so on.

Wilson visited Wa-shan again in 1908. In 1903 he climbed Wa-shan in June and Mount Omei in October.

On the whole this second Veitchian expedition yielded a dwarfer harvest than the first. Here are some of his introductions from this second expedition :

Berberis Gagnepainii, *polyantha*, *verruculosa*, *Wilsonae*.

Malus toringoides.

Meconopsis integrifolia, *punicea*.

Populus lasiocarpa.

Primula Cockburniana, *Veitchii*, *vittata*.

Rheum Alexandrae.

Rhododendron calophytum, *intricatum*, *lutescens*, *orbiculare*.

Sargentianum, *Souliei*.

Rosa Moyesii, *Willmottiae*.

Thalictrum dipterocarpum.

Viburnum Davidii.

On Wilson's return in March, 1905, from this second expedition, he spent the rest of the year in working over his plants and in a much needed holiday. Early in 1906 he was appointed a botanical assistant at the Imperial Institute. Before he had time to shake down in his new post, Professor Sargent, who had kept a watchful eye on him from the first, asked him to undertake a third trip to China, this time on behalf of the Arnold Arboretum. Wilson went to the United States early in 1907 and sailed again for China in December.

As soon as he reached Ichang he left at once for his old hunting ground amongst the limestone gorges of western Hupeh. But on this occasion, under the wise generalship of

Professor Sargent, he had a far freer hand to go where he willed and do what he liked. As Sargent was head of an arboretum, it was obvious that Wilson must put woody plants first; and he felt that no place could give him such a rich harvest as that difficult section of country. Later he moved again into Szechuan, and from Chengtu made another journey to Tatsien-lu, but this time by a more northerly route through the semi-independent feudal states of Wassu, Wokji and Mupin. The last, of course, was most important botanically, and it was here that Wilson was able to collect seed of so many plants first discovered in the same area by David many years before. From Mongkong, the chief centre of the feudal states, he bore south-west until he had crossed the Ta-p'ao-shan pass, a very rough journey, and then reached Tatsien-lu from the north.

Before he returned home, he found time to visit Wa-Wu-shan, the third of the remarkable hills west of Kiating-fu. The others are Mount Omei and Wa-shan. On his way back to Kiating-fu he crossed the Laolin (Wilderness) from north to south, possibly the only European to do so. During the entire journey of only about 70 miles over vile tracks, many of which had been swept away by fierce rainstorms, when he had to wade for long distances on the edge of the streams, he never saw anything beyond a radius of 50 yards owing to the mist and rain.

Wilson returned to England in May, 1909, and to the Arnold Arboretum in September of the same year. He had been very successful in collecting a fine harvest of seed, and among his introductions of these two years are :

Berberis Sargentiana.

Buddleia asiatica.

Cercidiphyllum japonicum var. *sinense*, the largest broad-leaved tree he found in that area.

Cornus kousa sinensis.

Cotoneaster divaricata, *salicifolia* var. *floccosa*.

Evodia hupehensis.

Exochorda Giraldii var. *Wilsonii*.
Hydrangea Sargentiana.
Lonicera nitida.
Magnolia Wilsonii.
Rhododendron Augustinii, *Williamsianum*.
Rosa Helenae.
Salix magnifica.
Spiraea arborea.
Staphylea holocarpha.
Styrax Wilsonii.
Viburnum Henryi.

Early in 1910 he was again in Ichang on his fourth and last expedition in China. This time he again made for north-western Hupeh, but altered his itinerary and travelled westwards for about 2000 miles parallel to the Yangtze but about 50 miles to the north of it. This brought him through the limestone hills of Hupeh out on to the red sandstone of Szechuan. The difficulty of the country is shown by the fact that it took Wilson and his experienced band of coolies twenty-two days to walk the 200 or so miles. In eastern Szechuan the country was kinder and also hotter, for Szechuan, or much of it including the Chengtu plain, is semi-tropical.

From Chengtu he made another trip to Sungpan in the far north-west of Szechuan, this time by a third route through very broken country that lay between his two previous routes. It was on this trip that an enormous landslide sweeping down a mountainside carried his sedan chair hundreds of feet down the precipitous bank to the river below. Wilson managed to jump out, but a rock caught and broke his leg. The camera legs were utilised as splints. After a long trek he was carried to a medical missionary. The leg healed badly, and it nearly had to be amputated. However, he ultimately left a Boston hospital as fit as ever with one leg slightly shorter than the other.

Although this expedition had to be cut short, it was exceptionally important as it was during 1910 that Wilson

collected and sent to America hundreds of bulbs of his greatest find, *Lilium regale*, the Regal Lily.

"To garden lovers everywhere these valleys are of special interest, inasmuch as they are the home of many beautiful Lilies. Each of these valleys has species or varieties peculiarly its own, which range up to about 8000 feet altitude, yet whilst very local these Lilies are numerically extraordinarily abundant. In late June and July it is possible to walk for days through a veritable wild garden dominated by these beautiful flowers. In the Min valley the charming *Lilium regale* luxuriates in rocky crevices, sun-baked throughout the greater part of the year. It grows 3 to 5 feet tall, and has slender leaves crowded on stems bearing several large funnel-shaped flowers, red-purple without, ivory-white suffused with canary-yellow within, often with the red-purple reflected through, and is deliciously fragrant."

Other plants of that fourth expedition are:

Berberis Vernae.

Lilium Davidii, Sargentiae, Willmottiae.

Picea asperata.

Wilson's next trip to the East was in 1914 when Professor Sargent (Wilson was now in the permanent employment of the Arnold Arboretum) sent him for almost a year to Japan. On this more civilised expedition he was accompanied by his wife and daughter, commemorated respectively in *Rosa Helenae* and *Arundinaria Murielae*. His main study during this year was the Flowering Cherry, which afterwards became a prime favourite of his. It was also on this trip that his friend, the nurseryman H. Suzuki, introduced him to the Kurume Azalea which Wilson later did so much to popularise. He saw them first in the nursery district of Hatagaya, a few miles north of Tokyo. "There in a garden I saw thousands of tiny plants bearing white and coloured flowers of nearly every hue."

In 1918 when he again visited Japan, Suzuki was able to

take him to the city of Kurume on the island of Kyushu. This was the headquarters of the Kurume family. Wilson wrote: "I went prepared to see a display of blossoms, but the entrancing beauty of myriad delicately coloured flowers clothing a multitude of shapely grown plants surpassed my most sanguine expectations. Most of the plants were trained into low standards, each about 20 inches high with flattened or convex crowns some 24 inches through, and were monuments to the patience and skill of the Japanese gardener."

The Kurume Azaleas were originated by a Japanese, Motozo Sakamoto who lived in Kurume about 1815. The parent came from sacred Mount Kirishima. Sakamoto collected several varieties, and raised and selected his own seedlings.

It is unfortunate that the Kurume Azalea, lovely though she is, has not borne out the early promise either in the British Isles or in the northern United States. She is not quite hardy enough to make a good show, except a few varieties in most favoured gardens.

In 1917 Wilson began his last expedition to the Far East. He began by exploring those curious islands of Liukiu and Bonin which were so often made a port of call in the early days of exploration in the Japanese seas and which are still so little known. Then he went on to Korea and the volcanic islands of Dagalet and Quelpaert, all very little known by Europeans. In Korea he spent the latter part of 1917 and was able to introduce one or two excellent plants from there, among them *Astilbe koreana*, *Forsythia ovata*, *Rhododendron Weyrichii*, *Spiraea trichocarpa* and *Stewartia koreana*.

In January 1918 he went to Formosa primarily to collect *Taiwania cryptomerioides*. He climbed Mount Morrison, the highest peak on the island, more than 13,000 feet, and when he returned in the autumn to collect the seed he was allowed to cross the extraordinary cliffs at the north-east end of the island. These rise so steeply from the sea as to be nearly sheer for thousands of feet. Yet such is the climate and formation of the rock that the upper thousands of feet contains an inter-

esting and abundant flora clinging to the face of the rock. There is a difficult and dangerous track high up these cliffs, and this Wilson was allowed to go along, certainly the first European to do so.

Apart from the *Cryptomeria* he introduced *Lilium philippinense formosanum*, *Lilium speciosum* var. *gloriosoides*, and *Pieris taiwanensis*.

In 1919 Wilson was appointed Assistant Director of the Arnold Arboretum. From 1920 to 1922 he made a tour of Australasia, South Africa and India. In 1927 he was appointed Keeper of the Arnold Arboretum on the death of Professor Sargent. On October 15th, 1930, he and Mrs. Wilson were killed in a motor accident near Worcester, Massachusetts.

In the last few years gardeners have tended to forget all that Wilson has done for horticulture by introducing new plants. In this plant-collecting business it is quite impossible to place individual collectors in order of merit or precedence; but I would say that Wilson was equal to the greatest. In some ways he has been handicapped. The firm of James Veitch and Sons were nearing the end of their existence when he went out to China for them. The directors were slightly imbued with Maries' idea that everything good in China had already been collected. In addition, the nursery stock at Coombe Wood was auctioned just as his original introductions were coming to the flowering stage. No effort was made to propagate them; consequently many of his plants, such as *Rhododendron insigne* and *Staphylea holocarpa rosea* have been extremely rare, and have only lately come into commerce.

If he had collected after the war when gardeners became enthusiastic about exotics—and unless you have general enthusiasm there is no incentive towards intensive propagation—many of his introductions would have been far more popular than they are to-day. His best work was undertaken just a generation too early.

Wilson in his day certainly did much to popularise good gardening in the United States both by precept in the excellent way in which the Arnold Arboretum was run, by the keen

interest which he took in the Massachusetts Horticultural Society, and in his writing. He was a writer of many parts: he could be severely technical in *The Lilies of Eastern Asia*; he could give information clearly, readably and without frills in *A Naturalist in Western China*, one of the most informative books on botanical exploration ever written; he could be as popular as you like writing for the large, sprouting American gardening public in *Aristocrats of the Garden*, when publicity gave him the nickname of "Chinese" Wilson, a name which he good-humouredly put up with and secretly disliked; he could lecture extremely well. But in whatever mood he was in he always insisted on being accurate, and he rarely made a mis-statement.

CHAPTER VI

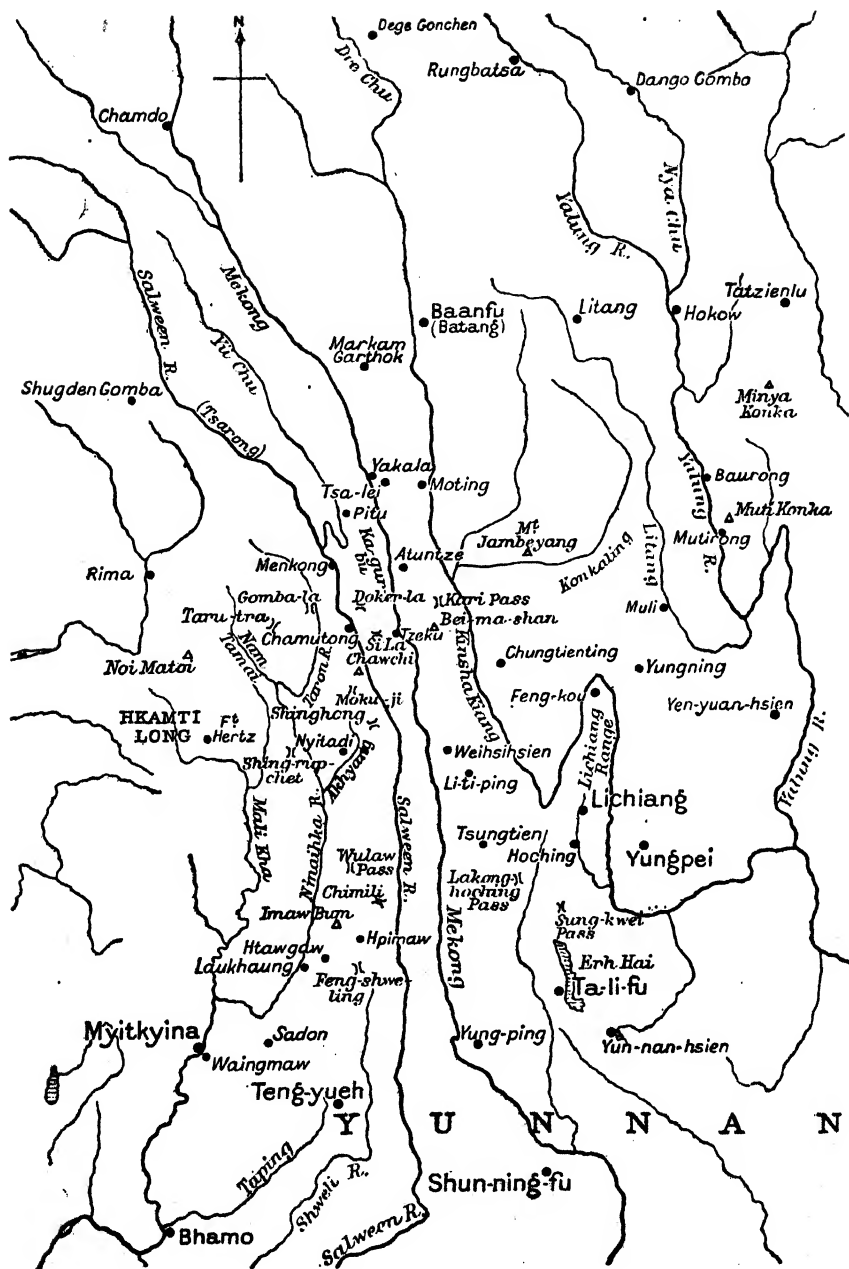
MODERN BRITISH AND AMERICAN COLLECTORS

I

George Forrest (1873-1932)

WITH the arrival of George Forrest on the collecting scene there began a new method of financing botanical exploration. In the past collectors had been sent out under the auspices and in the pay of scientific societies or of government departments, and in later years of nursery firms or of single private individuals. With the widening of general interest and the rapid increase in cost of travel, both amateur and scientific, the well organised plant-collecting expedition went beyond the scope of any single individual or body. No one garden, whether public or private, could hope to raise and bring to successful maturity the total results of the harvest of one year's work in such a fruitful area as western China. With the introduction not only of new plants but of new kinds of plants that necessitated revision of the usual garden technique, it was felt that the more who experimented with a new but lovely plant the better chance there was of ultimate success in one garden or another. Also, the very fact that a fine new plant was being grown in a number of areas tended towards a more universal distribution among the gardening fraternity at an earlier date. Also, the more people who contributed towards the cost of the expedition the smaller would be the financial outlay of any one individual.

Thus the gardening syndicate came into being; and it has been syndicates of various sizes that have financed almost every botanical expedition sent out from the British Isles during the past twenty-five years. The shares have varied



YUNNAN AND THE GREAT COLLECTING DISTRICTS

from many hundreds of pounds to a very few pounds, according to the time spent abroad and the number of subscribers.

In the case of George Forrest the shareholders were few and formed a close corporation except in the case of his last expedition. The shares of seeds were correspondingly large, as the thoroughness with which all his trips were organised necessitated a large pay roll and costly travelling.

As will be seen, these elaborate expeditions were eminently successful, and an enormous number of fine new garden plants were introduced into cultivation. But at one period the harvests of Forrest, Kingdon Ward, Rock and others were poured into the British Isles and the United States in such quantity that the influx of exotics reached the dimensions of a flood and most gardens were soon filled to saturating point. The flood-tide has passed, but the spate while it lasted was of such magnitude that many fine plants that might have come into cultivation under more leisurely circumstances were left behind and ignored in favour of more flamboyant cousins. They have long disappeared from ken, and some day will be worth re-introducing.

Unfortunately this is particularly the case with many of the introductions of George Forrest. Not only did he collect on a larger scale than others, but one of his chief supporters, the late J. C. Williams, paid him a bonus for each *Rhododendron* found and described as a new species by Sir Isaac Bayley Balfour. This meant that most of his subscribers specialised in *Rhododendrons* to the exclusion or neglect of other fine genera.

George Forrest was born at Falkirk, Scotland, in 1873. After some training as a chemist's apprentice he was able to visit relatives in Australia and did not return until 1902. He was always interested in wild flowers and collecting specimens. Shortly after his return he met Sir Isaac Bayley Balfour, who gave him a small position in the herbarium of the Royal Botanic Garden at Edinburgh.

Actually his chance to go to China came through A. K. Bulley of Neston in Cheshire, one of the first men, along

with Sir Isaac Bayley Balfour and John Charles Williams, to realise the importance of north-west Yunnan as a plant-hunting paradise.

Short, sturdy and stocky with a constitution like iron, Forrest was an ideal man for the job. He had a natural flair for plants, especially for those genera, like *Primula* and *Rhododendron*, to which he was very attached. As a rule he got on very well with the natives, understanding them as a dour and canny Scot will understand almost all dwellers in the hills. He did not suffer fools gladly, and did not like others poaching in what he considered to be his own special preserves. But those who knew him best loved him for his transparent honesty, his fixity of purpose and his very real love of flowers.

In all he made seven expeditions to Yunnan; and he died during the seventh. The dates are as follows:

First expedition	-	May 1904—April 1907
Second ,,	-	January 1910—March 1911
Third ,,	-	February 1912—March 1915
Fourth ,,	-	January 1917—March 1920
Fifth ,,	-	January 1921—March 1923
Sixth ,,	-	January 1924—March 1926
Seventh ,,	-	November 1930—January 1932

It might be said that George Forrest was the first man to bring business methods into the pursuit of plant collecting; and that is said without any disparagement. Various individuals prefer different methods. Potanin travelled with an armed guard of cossacks, scientists of various kinds and always one or two personal assistants, but either he or his wife collected all plants which he said he collected. Farrer always insisted on the personal side of collecting. He saw almost every plant with his own eyes, collected it, dried it and afterwards harvested the seed. Kingdon Ward also prefers this method. But Forrest wanted to cover as much ground as possible.

Wilson before him, and still earlier Delavay, Ford and Augustine Henry, had used natives as collectors, Delavay and Augustine Henry only spasmodically when someone happened to be going to a particular spot. Wilson was more thorough. He trained his own men, and they were with him throughout his various expeditions in China. But they were always in close contact, acting as skirmishers in order to cover a wider area and so save time, but always under Wilson's eye.

Not so with Forrest. Most of his men were thoroughly trained, and worked far away on their own. They even went off and collected for months while Forrest was in England; and made at least one trip for Lord Aberconway after Forrest's death. Most of them came from one Mosso village, U-lu-kaey, in the Lichiang range and so were friends and relatives. While the plan of using native collectors was used by Forrest early in his collecting career, it grew as time went on until he employed more than twenty men.

Forrest's plan was to settle himself in some centre from which he could presumably collect or superintend the collecting in some important neighbourhood. At the same time others of his staff were either collecting stragglers missed on some previous occasion or prospecting in new country. As long ago as 1913 he had this method reduced to a fine art. He describes a season's instructions in one of his letters as follows:

"In passing through Tali I engaged two men to work the range there, one of them was with me for several years, Lao Song by name. He had a post in the police, but voluntarily resigned to offer his services to me. To-morrow two of my Mosso collectors return to Tali to assist the two men engaged there. They have instructions to collect on both flanks of the range but principally the western flank which is untouched. We ought to get something good. They have instructions to secure seed of the orange form of *Rhododendron dichroanthum*, also *Primula spicata*, *P. serratifolia*, *P. calliantha*, *P. amethystina*, *P. caerulea*, etc., etc.

"My two men at Tengyueh are doing well, I hear, and in a month's time two men go off to Chungtien to work the mountains there, and two off to the Wei-hsi-ting ranges. If all goes well we ought to have a record bag this season."

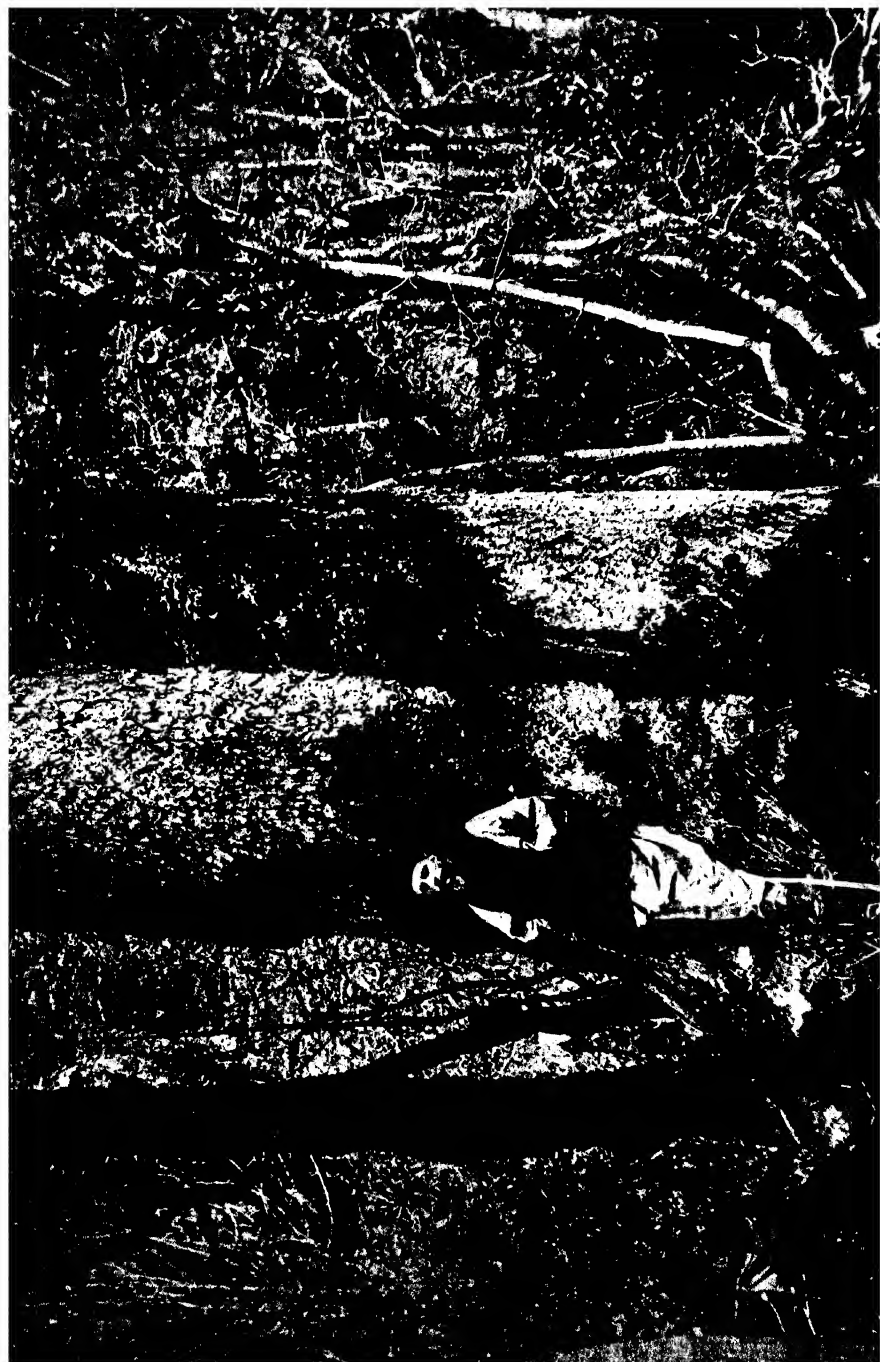
That was an extensive schedule that seemed to work well in fact. We know from what Forrest has said that some of his finest plants were brought in by his collectors. What is not quite so certain is the success of the harvest. Specimens of plants in flower, or even in fruit, are something tangible, which can be recognised. Seed is not so easy. It is not quite certain to what extent he relied on his men working on their own for actual seed collecting. On several occasions mistakes were made and the seed did not correspond with the name.

It is more than unfortunate that Forrest wrote so very little on his work and on his travels. His published writings, apart from field notes, consist of one article in the *Geographical Journal* and two in the *Journal of the Royal Horticultural Society*, several in *The Gardeners' Chronicle* and a few oddments elsewhere. He kept no diaries or journals. A few letters still exist from his first, third, fourth and sixth expeditions chiefly full of botanical detail except in the first instance.

Thus it is almost impossible to work out his exact routes, as he rarely differentiated between plants collected by himself and by his men. Plants are noted on almost the same day as having been collected as far afield as Teng-Yueh and the Lichiang Range; one obviously by some of his staff, the other possibly by himself. Dr. J. Macqueen Cowan at the Royal Botanic Garden at Edinburgh has gone through almost every specimen and has marked on a map the areas in which he collected during each expedition. The result shows Forrest's keenness to have each area of first-class importance worked over time and again in case anything important was missed.

The districts in which plants were collected on the various expeditions are given below. It is impossible to tell Forrest's own movements apart from those of his native collectors.

- 1904-1906.—Bhamo to Teng-yueh—south near Lung-ling—Shweli-Salween divide and frontier range and Salween valley as far north as 27° —Mekong-Salween divide near Tseku—district round Li-ti-ping—Chungtien plateau—Lichiang range—Hoching—Tali to Yunnan-fu—Tali-fu to Teng-yueh.
- 1910.—Bhamo to Teng-yueh—Shweli-Salween divide—Teng-yueh to Tali—Tali north to Lichiang range.
- 1912-1914.—Bhamo to Teng-yueh—Shweli-Salween divide—Teng-yueh to Tali—south of Tali—east of Tali—west of Tali (this was the trip in which the Tali country was most thoroughly explored)—Lichiang range—east of Lichiang-fu to Yung-pei across the Yangtze—the country round Yung-ning beyond the Yangtze bend—Chungtien plateau—Yangtze-Mekong divide—Kari pass—Atuntze—The Mekong-Salween divide as far north as 29° —the country north of Li-ti-ping.
- 1917-1919.—Shweli-Salween and Shweli-Taping divides—Mekong-Salween divide in the dry belt about 26° —also farther north by Tseku—Atuntze, Bei-ma-shan and the Kari Pass—Chungtien plateau—across the Yangtze to Muli—east side of the Lichiang range.
- 1921-1923.—Shweli-Salween divide—a great stretch of country between the Mekong and the Lakong-hoching pass—round Weihsi-hsien—the Salween-Taron divide and country in south-east Tibet north of $27^{\circ} 50'$ —the Chungtien plateau and country north of the Yangtze as far east as Muli—country round Yung-pei east of Lichiang-fu.
- 1924-1925.—The whole of the Salween-N'mai-hka divide as far north as $27^{\circ} 50'$ —the Salween-Mekong divide below $27^{\circ} 50'$ and the country round Weihsi-hsien—an area just north of Shunning-fu.
- 1930-1931.—Forrest had men in almost all areas previously covered by him with the exception of country west of the Mekong north of 27° .





The first expedition was financed almost entirely by A. K. Bulley, those following by various syndicates usually headed by J. C. Williams of Caerhays Castle in Cornwall where so many of Forrest's plants are so magnificently grown.

On several occasions during his first expedition he had as a companion Mr. Litton, British consul at Teng-yueh, after whom the famous *Primula Littoniana* is named. They certainly went once to Lichiang together, and they made a trip up the Upper Salween as far north as lat. 27° through country inhabited by the Lissus that had never been visited by a white man before.

As an example of the enormous amount of ground covered during one expedition, the fifth tour, from January, 1921 to March, 1923, specimens exist collected in quantity from the following areas: south-eastern Tibet in the Tsarong area, also south of that on the Salween-N'Mai-hka divide; round Tseku and the Doker-la, up to Atuntze by way of the Bei-mashan; the Chungtien plateau; Forrest's favourite Lichiang range; Müli and the country round Yung-ning; east of the Yangtze bend at Li-ti-ping; east of Lichiang in the Yung-peï district across the Yangtze; south-west of Lichiang in Delavay's old country; and the hills just north of Tali lake.

Work on this scale over the short period of two collecting seasons could only be done with very careful staff work and with an immense amount of labour, as it must be remembered that the least part of the work involved is the actual finding of the plants. Superintending the drying; writing every field note in his own hand; deciding what seed should be collected; making all arrangements for and with his collectors—that is all work that cannot be postponed. And Forrest had to do it all himself; in all his long career he never had any European assistance, and rarely a European companion after Litton's death.

Forrest was always impressed with the scenery of the Upper Salween. He once wrote in the *Geographical Journal*: "But the scenery of the upper Salween can never be forgotten

P.H.C.

L

by anyone who has wondered at it in the rich sunshine which prevails after the autumn rains have given way to the first touch of winter. The great variety of rock formation, the abundant forests and vegetation, and the diversity of light effects between the summits of the ranges (at 10,000 to 13,000 feet), and the abyss in which the river flows produce a vast panorama of ever-changing beauty. In the morning, the sun, as it touches the top of the Mekong divide, sends wide shafts of turquoise light down the side gullies to the river, which seems to be transformed into silver. The pines along the top of the ridges stand out as if limned by the hand of a Japanese artist. In the evening all the wide slopes of the Mekong side are flooded with red and orange lights, which defy photography and would be the despair of a Turner. The traveller whose fortune it has been to explore the great rivers of this, our north-east Indian frontier, will admit that the Salween, while it is inhospitable, difficult and barbarous, far exceeds in natural beauty all the valleys of the sister rivers, the Yangtzu, the Mekong or the Irawadi."

Later again, in 1905, Forrest made another trip to the Lichiang range which had obviously struck him already as an area of the greatest importance. While he was getting to know the country, it mattered little to him what time of year he travelled. He was certainly in the Lichiang Range in late autumn, for in November he wrote that he was just about to start for the Chungtien plateau. Later he wrote: "There was no snow on the plateau although the hills in every direction were white for thousands of feet. The bitter wind from the north west, blowing over the snow-clad Tibetan mountains, was a curse to us all the time we were on the plateau. It made every one of us as crabbed as the very deuce, and before a couple of days had passed I fear very much if you would have recognised me. My hands, face and lips were so severely chapped that every movement was torture to me, and as for laughing, that was out of the question altogether, even supposing there had been anything to laugh at."

The main goal of this winter trip was Atuntze, but when

Forrest reached the town of Chungtien he found the pass beyond was completely blocked. He returned by another route. In this same letter he gives an account of some of the scenery on the edge of the plateau; "The valley of the Hy-pa-low opens out from the foot instead of the other way. At its junction with the valley of the Chung Tien it is probably only about two miles broad, but opens up gradually towards the head, where it is more than twelve miles wide. The main range, a continuation of the Lichiang Range, runs along behind this and blocks the view at a distance of probably twenty miles. The glacier, a huge mass of ice and snow of many miles in extent, lies on the north eastern slope of the culminating peak of the range. This peak I estimate at over 20,000 feet, and the snow cap on top, easily distinguishable owing to the bare precipice beneath, at several hundreds of feet. From the snow line to the summit would be, I am sure, 6,000 or 7,000 feet. It has to be seen to be realised. Dark rolling Pine woods gradually merge into bare crags, then the huge peaks and domes of snow glistening like silver in the bright sunlight. Add to this an atmosphere as clear as a bell; blue sky such as one never sees at home, and you have a picture that I for one could sit and look at for ever, I think, without being satisfied."

This autumn reconnaissance of 900 miles took fifty-three days.

On another occasion Litton and Forrest travelled even farther to the north-west to Tseku on the Mekong, a French missionary headquarters. They were well received, and after a day or two Forrest wrote: "I got a great deal of information from the fathers regarding the flowers of the district, and this was so satisfactory that I am going back there in February or March, unless recalled before then, to spend six months collecting on the dividing range. They have been collecting this last year for the Paris Herbarium. I saw their collection and got a number of specimens out of it from them, but although well pressed, they are very scrappy and incomplete. Apparently there are a great number of *Rhododendrons*,

Azaleas, Primulas, Gentians and Liliaceous plants on the range behind Tseku."

Forrest did return to Tseku later in 1905, and it was on this occasion that he nearly lost his life. The Tibetan lamas at Batang far to the north had revolted, murdered the Chinese and the missionaries in that town and marched southwards to Atuntze. From there they attacked Tseku, and here also the missionaries were murdered while trying to escape. By the greatest good luck Forrest got away into the jungle where he hid for nine days while the Tibetans were searching for him. Then he got away to a friendly Lissu village. Naturally he lost all his belongings and the botanical specimens he had collected. Quite undaunted he went on collecting in the neighbourhood.

This first expedition was the only occasion on which he visited Yunnan-fu, the capital of the province.

Little is known about his second expedition from January 1910 to March, 1911. You will note that he was in China actually for under a year. His time was mostly spent on the Tali range, north of the lake and in the Lichiang range. It was probable that one of the stopping places on this trip was the village from which afterwards he enlisted most of his collectors.

The third expedition was a long one, from February, 1912, to March, 1915. During these years he worked as far east as Yung-ning, north-east of the Yangtze Bend, and as far west as the great mountain mass of Ka-gur-bu west of Atuntze. But as far as can be gathered his main work was in the Lichiang range and the Chungtien plateau. He made his headquarters, certainly for most of 1913, at U-lu-kay, about 15 miles north of the town of Lichiang.

It was during this expedition that he began to try his best to hammer into gardeners at home the fact that by far the greater part of the mountains of north-west Yunnan were limestone.

"The Rhododendron authorities at home talk of the impossibility of growing Rhododendrons on limestone. I wish

I had them here just now! to see *Rhododendron chartophyllum* and its form *praecox*, miles (no exaggeration) of bloom, and every plant on pure limestone, many growing on the bare rock. . . . The above applies to almost all the species on the range."

Then again: "My experience is that plants growing in a limestone soil are more given to sporting than others, and all this region is limestone. The Lichiang range is purely and simply a solid block of limestone from end to end."

One of his side trips on the way to Lichiang was by way of the Lang-kong-Hoching range. This is one of the real dry areas which crop up so unexpectedly in Yunnan. Here is a short account he gave of it in a letter: "Lower down [the range] in the same dry area, and my word it was warm that afternoon! bare limestone and the driest of the most dry pasture everywhere around, a brazen sky and blazing sun above, and no water for miles, I came on *Primula malvacea*, *P. pulchella* and *Androscae spinulifera*. This is the original area where they were discovered, by Delavay, or his collectors, and I now understand the reason why the specimens in the Paris Herbarium have such a dried-up, starved appearance. The struggle for existence with the other xerophytes inhabiting the region must be intense."

During this period on the Lichiang range Forrest wrote a most interesting account of the results of forest fires.

"When last I was here in 1910 these areas were densely clothed in forests of Larch, Pine and Abies, with an undergrowth of dwarf, 1-2 feet, evergreen spinous-leaved Oak, and straggly, drawn-up specimens of such *Rhododendrons* as *Fortunei*, *racemosum*, *praecox* and *lepidotum*. The cause of the fire is immaterial. The forest was probably set alight intentionally to obtain dry timber, the tribespeople have most weird and improvident methods. What I wish to point out is the marvellous hardiness of the *Rhododendrons* to withstand such a fire when the heavier timber succumbed, and also the remarkably symmetrical growth of each of the species since

the time of the fire. On an average the shrubs are 2½-3 feet high, by about as many or more in diameter, and I don't think I have witnessed such a fine sight as the mass of bloom borne by each individual plant, the size and purity of those blooms, and the extremely artificial aspect of the whole scene caused by the regular spacing of the plants. The whole scene gave one the impression as of having been laid out by an expert landscape gardener, as indeed it had by nature. What of course contributed largely to the general effect was the splendid groundwork of compact masses of the glossy green foliage of the evergreen Oak from amidst which the plants arose. It formed a most admirable setting.

One thing is certain, and that is that, in their native habitat at all events, these Rhododendrons agree wonderfully well with a set back. I examined many of the plants, and, without exception, they had been burned right down to the ground surface."

Unfortunately from the seed point of view this expedition was not a great success. 1914 was a year of quite extraordinary rain over the whole of south-west China. Forrest wrote that while he and Camillo Schneider were at Lichiang it had rained continuously for more than forty consecutive days, a bad record even for a wet range like the Lichiang, and absolute ruination to the seed harvest.

The fourth expedition from January, 1917 to March, 1920, was of great importance. By this time Forrest knew his country and his people so well and had his men so excellently trained that he was able to cover an enormous stretch of territory, and cover it with great thoroughness.

One of the areas covered was that around Teng-yueh including the heavily wooded Shweli-Salween divide. It is in country like this that the big-leaved Rhododendrons of the *Falconeri* and *Grande* series are to be found in quantity, sometimes forming the dominant tree with an undergrowth of dwarf Bamboo.

Another area was that of Muli, across the Yangtze and

north of Yung-ning. This was the farthest north-east that Forrest reached, not far short of the Yalung river.

Still another area thoroughly worked over during these years was the country north of Tesku where he suffered disaster in 1905. This time he was extremely successful and was able to explore thoroughly two important areas, that of Ka-gur-bu on the Mekong-Salween divide with the country north of the Chu-la (this was the farthest north that Forrest hunted), and the great mountain mass of Bei-ma-shan on the Mekong-Yangtze divide.

Equally important was the fifth expedition from January, 1921, to March, 1923. Although a year shorter, he was able consistently to enlarge the scope of his work. On this trip the country east and north of Atuntze was worked over and also east and north of Muli where fine collections were made, but unfortunately the seed could not be harvested owing to incipient trouble with the monks. Then further work was done to the east of Yung-pei, but this country was found to be very dry. It was on his way there on meadows near the summit of the much-travelled Sung Kwei pass, north of Tali-fu, that he found that fine form of *Rhododendron recemosum*, dwarfer and far richer in the pink colouring, that usually goes under the number F.19404.

But far the most important area searched was that of the Salween-Kui-kiang divide. Although usually marked Kui-kiang on maps with Chinese affinities, it is only the Chinese name of the Taron, which in turn is a name for the upper waters of the N'mai-hka, the eastern confluent of the Irrawaddy. Here he came upon such extraordinary Rhododendrons, apparently becoming plentiful and finer as he went north-west, that Forrest evolved a theory that somewhere higher up in Tibet, a little to the north of this divide, there was a valley that was the real home of the Rhododendron.

Most extraordinary of the plants collected on this Salween-Kui-kiang areas were the varied-coloured forms of Rhododendrons. *R. floccigerum* varied from black-crimson through yellow to snow-white; *R. haematodes* was the same, but the

star turn for colour variation was *R. eclectum*, in white spotted crimson, rose magenta, pure white, pale yellow, yellow lined with margined rose, and so on.

While working himself in that area, Forrest had several men trying to link up from the north with the area in which Farrer died, on the N'mai-hka-Salween divide.

The sixth expedition from January, 1924, to March, 1926, was mostly spent on or near the Burmese frontier. This time he again definitely tackled the Farrer country, first about Hpimaw and the Chimili valley, then the area in which Farrer died, the Chawchi pass, and so on. From there he covered a great area due east as far as Li-ti-ping, not a great distance from the Yangtze. In this was included a section of the Salween-Mekong divide which he had not touched previously.

The seventh expedition was to have been his swan song. He returned to Yunnan for the last time with the deliberate intention of re-collecting in all the best areas in which he had worked before, particularly so as to collect seed of fine plants that he had found but not introduced successfully. No new ground was to be tackled. Then he died in January, 1932; but an enormous harvest of seed came home.

As a plant collector Forrest was in the front rank. His dried material was always excellent, his seeds well matured and clean. Not being a gardener he sometimes might have been more explicit in his field notes, but that is a failing of most collectors. He had a real love for his job, and did his work most conscientiously. It is no exaggeration to say that he knew stretches of the Yunnanese ranges tens of miles in extent as well as some of us know Glen Clova or Ben Lawers. His memory was prodigious, not only for geographical situations where certain plants were to be found, but also for plant types.

The number of his dried specimen sheets reached the grand total of 31,015. During his trips he must have sent home almost hundredweights of seeds, for he was never niggardly in his harvest. It is only a pity that so much came at once. Few private gardeners have the opportunity of doing

justice to well over a hundred seed packets arriving at the same time, even if they were sufficiently enthusiastic to wish to cultivate in bulk this mass of potential plants. As a rule Forrest had a discerning eye; he rarely included rubbish, but a plant in the wilds seen under perfect conditions may look better in its own home than in a garden. It is difficult to have the critical faculty working at full pressure all the time.

Here is an extract from one of the last letters received from him before his death, which shows the quantity of seed which he collected: "Of seed, such an abundance, that I scarce know where to commence, nearly everything I wished for and that means a lot. Primulas in profusion, seed of some of them as much as 3-5 lbs., same as *Meconopsis*, *Nomocharis*, *Lilium*, as well as bulbs of the latter. When all are dealt with and packed I expect to have nearly, if not more than two mule-loads of good clean seed, representing some 4-500 species, and a mule-load means 130-150 lbs. That is something like 300 lbs. of seed. . . .

"If all goes well I shall have made a rather glorious and satisfactory finish to all my past years of labour."

The seed arrived home safely, but plants that in past sendings had refused to behave themselves as seedlings or to come to maturity, acted in similar fashion. So nothing very much came of all this vast amount of seed.

With so much material it is difficult to pick out which are the best of Forrest's introductions. Certain plants at once come to mind: *Gentiana sino-ornata*, *Primula nutans* and *P. Bulleyana*, *Rhododendron Griersonianum* and *R. repens*, *Iris chrysographes*.

Opposite page 143 will be found an illustration of the first photograph of his most popular plant, *Gentiana sino-ornata*, taken in its native habitat in September, 1904, not very long after he first went to China. The field-note accompanying this find, reads as follows :

"No. 408. Boggy ground. Summit of Nie Chang

pass between River Yangtze and Chung Tien plateau. Elevation 14-15,000 feet. Flower deep blue. Yunnan, Sept. 1904."

Not very exciting reading for what is now a universal favourite. It could also be cited as an excellent example of a field-note that gives a minimum of necessary information. Forrest was young then and inexperienced, but informative field-notes were never a strong point with him.

Sir Isaac Bailey Balfour at first considered it to be the Himalayan *Gentiana ornata*. Not until some time later was it described as a new species and named *G. sino-ornata*.

So many plants have been introduced by George Forrest that a rather longer list than usual is given of some of his best-known introductions:

Abies Forrestii.

Acer Davidii, *Forrestii*.

Allium Beesianum.

Aster Forrestii.

Betula Delavayi var. *Forrestii*.

Buddleia Fallowiana.

Clethra Delavayi.

Codonopsis Meleagris.

Cynoglossum amabile.

Delphinium likiangense.

Dracocephalum Forrestii, *Isabellae*.

Gaultheria Forrestii.

Gentiana sino-ornata.

Hypericum patulum var. *Forrestii*.

Incarvillea Delavayi.

Iris chrysographes, *Forrestii*.

Magnolia Delavayi.

Nomocharis aperta, *Mairei*, *pardanthina*, *saluenense*.

Paeonia Delavayi.

Pieris Forrestii.

Polygonum lichiangense.

Primula Beesiana, Bulleyana, chionantha, Forrestii, helodoxa, Littoniana, malacoides, nutans, secundiflora.

Rhododendron arizelum, chaetomallum, cyclium, diaprepes, didymum, fictolacteam, fulvum, giganteum, Griesonianum, impeditum, lacteam, mollicomum, muliense, neriiflorum, oreotrephe, puralbum, scintillans, scyphocalyx, sinogrande, radicans, repens, Valentinianum.

Sorbus Harrowiana.

Roscoeae cautleoides, Humeana.

Thalictrum dipterocarpum.

This is but a tithe of the possible number of his introductions, but sufficient to show how eclectic were his tastes. There are plants there to suit everybody.

As I explained at the beginning of this account of George Forrest, many of his fine introductions were ignored in the hectic hunt and ultimate glorification of the genus *Rhododendron*. Future collectors and gardeners may realise what a great deal has been missed in this almost unhealthy craze for plants of one genus, but gardeners of all eras have suffered from violent fancies, from Gooseberries to Cacti, and Camellias to Grasses, so the *Rhododendron* enthusiast cannot be blamed for giving way to this harmless vice; but it has postponed the introduction of many fine plants for many years and has left this task for future generations of gardeners.

George Forrest's name will always stand high among plant collectors. His taste was unimpeachable, his organisation was probably more thorough than that of any other plant collector and he was lucky enough to spend the best years of his life in an area of the world quite unrivalled for its magnificent flora.

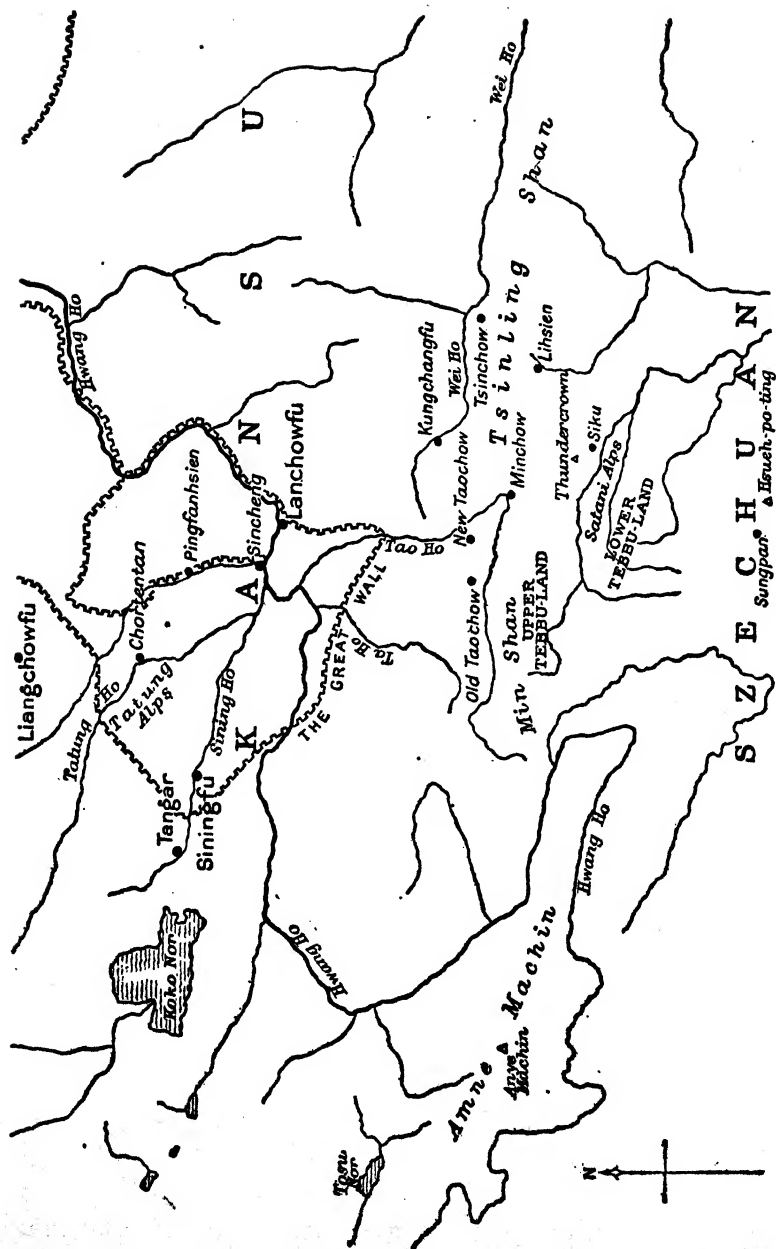
2

Reginald Farrer (1880-1920)

Reginald Farrer's technique and importance differed entirely from that of George Forrest. Probably Farrer's greatest influence on contemporary gardening was not as a collector but as a gardening writer; and this influence reached far beyond the actual public that read his books. He arrived on the scenes at the psychological moment. The average gardener was becoming tired and bored with the usual Edwardian garden, itself a sophisticated offshoot of the Victorian lay-out. Its appetite for the more natural and robust type of horticulture was being whetted by Edward Robinson and Gertrude Jekyll, but they being elderly and stay-at-homes lacked the knowledge and vigour to popularise new plants from overseas. It was in this that Farrer was supreme.

His writings caught the fancy of the more observant gardening public, and the plants he described were sought for and grown. At the start he concentrated on plants from the Alps of Europe, but again his two books, *On the Eaves of the World* and *The Rainbow Bridge*, appeared in 1917 and 1921 at a psychologically auspicious moment. It would be ridiculous to lay too much emphasis on their importance, but those two books undoubtedly helped to increase the momentum of a movement towards the more general cultivation of plants from the Far East.

It is necessary to stress this side of Farrer's work. His vivid writing with his trick of over-emphasis, his resounding descriptions, the constant feeling running through all he wrote that he always enjoyed himself in the hills, these all helped to bring a new public into the gardening fold, and this new public is of importance, as on it rests the question of supply and demand.



KANSU AND THE TIBETAN MARCHES

Notice how the pendulum swings from side to side: in the early nineteenth century there existed the Horticultural Society, a collection of the gardening elite, striving to introduce new varieties and forms of Chinese garden plants, tumbling over themselves in order to obtain new ideas and novelties in plants. Yet this was all within a very limited circle.

This was no fault of theirs. It is obvious from the horticultural journals of the time that they were perfectly willing to help in the general distribution. They were even more generous in plants and advice than some of the experts of to-day, but the gardening public was limited in extent, and even what there was did not respond. In the Victorian era the history of hardy plant introduction, apart from general favourites like the Chrysanthemum, is a melancholy tale of wasted effort and public apathy. There were a few enthusiasts from the original group of the Horticultural Society, but as they died even these sources of demand dried up. Exotics disappeared from gardens with the consequence that interest waned. There was a recrudescence of interest in the middle of the century when Robert Fortune appeared on the scene. This time a slightly wider public was concerned; nurserymen found that it paid them to take their share. But this was only fleeting. Early in the latter half of the century the gardening world sank back into the lethargy of the Victorian garden, a lethargy that really lasted until 1914.

In China, newly opened to Europeans, the hinterland was searched by plenty of botanical collectors, but there must be a demand at home before they or others will take the trouble to become plant introducers; and this demand did not exist. The great firm of James Veitch & Sons tried first of all with Maries and later with E. H. Wilson to restart an interest in plants from the east, but they were somewhat before the time. Little interest was shown by the gardening public in Wilson's new introductions. As I explained before, this is the reason why so many of his plants are very scarce to-day.

Then came a new combination of conditions, a vastly

increased gardening public, a nursery trade handicapped by the lack of new varieties produced during the war years from 1914-1918, a general widening of interest, the presence in the Far East of two excellent collectors, George Forrest and F. Kingdon Ward, both sending home quantities of seed of many new plants, and the writings of Reginald Farrer to titillate the imagination of budding gardeners and to weave a kind of spell over the whole process of plant collecting in the East.

Yet it must not be thought that Farrer was not a good collector himself. He had a fine eye for a plant and unbounded enthusiasm. In fact his prowess as a plant introducer more than outweighed his care as a botanical collector, for he abhorred weeds, and would not collect herbarium material unless he proposed collecting the seed of the plant afterwards. Thus from a botanical standpoint, where everything in a strange land is worthy of inclusion in the vasculum, he was slipshod in his methods. This is proved by the fact that during his two expeditions, one through an extremely rich area, he only collected about 1920 specimens. But possibly the majority of them would make fine garden plants, if only they would grow under cultivation.

Reginald Farrer was born in 1880. Owing to ill-health as a child he was educated at his home at Ingleborough in Yorkshire, among those limestone hills that contains about the best hill flora in the British Isles. From an early age he was interested in alpine, and he made his first rock garden when he was fourteen. After going to Oxford he passed most of his time gardening and plant collecting in the European Alps, which he knew thoroughly.

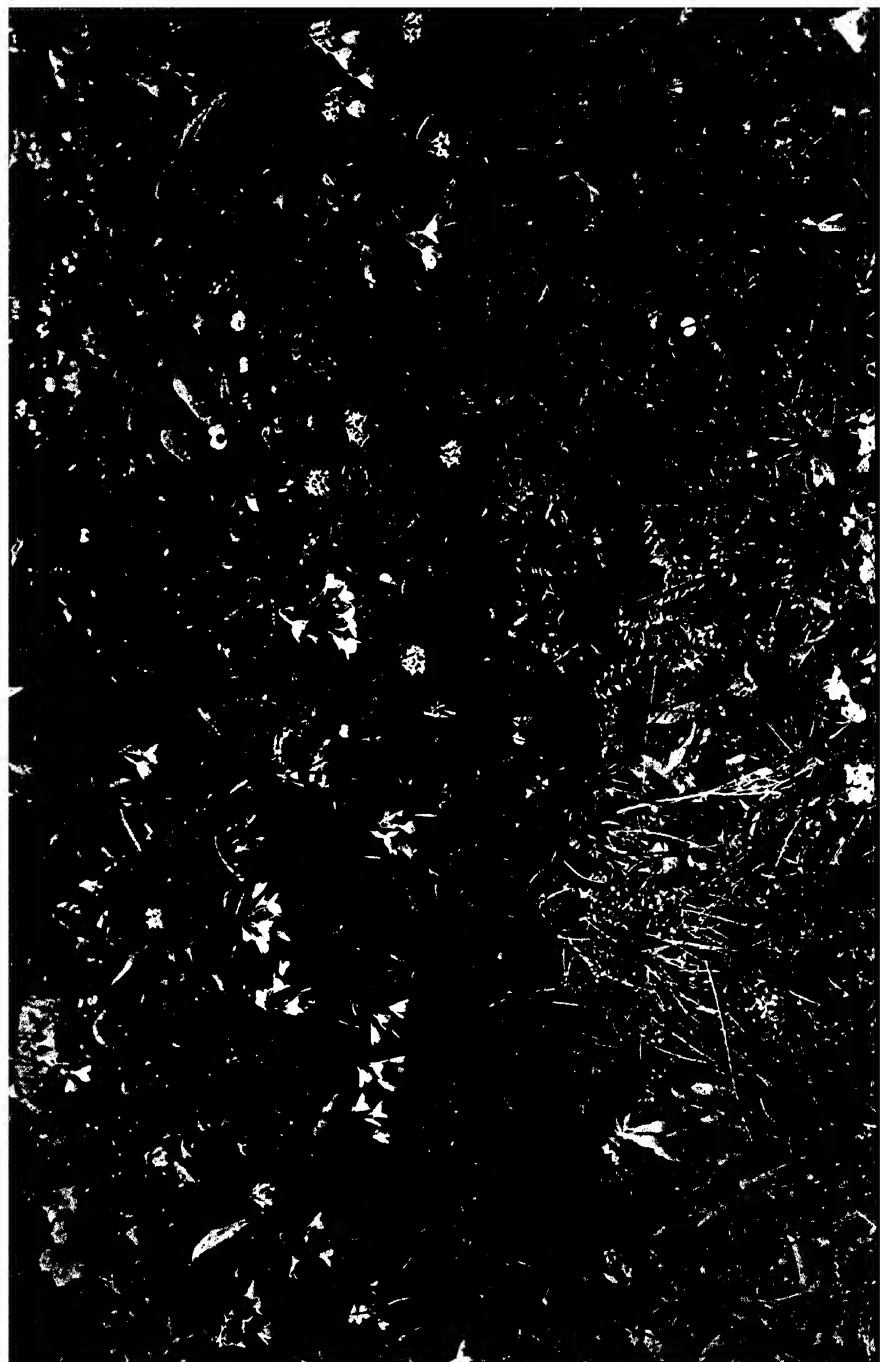
His attention was drawn to China, I think, through his researches in connection with his great work, *The English Rock Garden*, which was conceived in 1912 or earlier and written in 1913, although not published until 1919. During these days of hard work in botanical libraries he came across descriptions of collecting done by Przewalski in the Ta-tung Alps and Potanin in the mountains round Siku, both in north-west Kansu. Both these areas struck him as possessing typical

high alpine conditions and a promising flora that would be worth investigating further and introducing to gardens. He was lucky in his companion, William Purdom, who had already travelled for Veitch and the Arnold Arboretum in the Ts'in-ling range in 1911. Purdom was an excellent traveller and ultimately became inspector of forests in the Chinese Government; but he was always shy and retiring, quite overshadowed by Farrer's personality. Purdom, however, was a perfect companion who knew the Chinese well and was much liked by them in return. It was largely owing to his tact that this Kansu expedition was a success. The Kansu-Tibet border was always in a state of nervous tension, at this time increased to boiling point by the general political conditions in China. Brigandage was rife; in addition, the never-ending friction between the Chinese and Mohammedans, numerically strong in many parts of the Tibetan Marches, was particularly troublesome.

During the first year, 1914, Farrer and Purdom worked in the hills to the south of Lanchow, the capital of Kansu. These ranges formed offshoots of the great central range of Min-shan. This was the country of Potanin and, particularly, of his companion, Berezovski, who found the zoology of these alps extremely interesting. Farrer left the main road from Sian-fu to Lanchow, and at Tsin-chow began to work southwest to the Nan-hor, and the Sha-tan-yu alps. These Farrer called Satanee. In his usual energetic fashion he refused to follow the usual spelling of Chinese place names and formed his own phonetic parallels. This is not an aid in following his routes.

It was on this stretch of road that they first came across *Viburnum fragrans* as a wild plant. For centuries it had been popular in gardens throughout north China. It was first noticed so long ago as 1750 by d'Incarville in Peking gardens, but this was the first time that its native home had been discovered. Farrer wrote: "Shallow scrub and coppice descended here to the track-side, and here we come on the *Viburnum*, at first isolated and suspicious, but soon in such quantity and





such situations that one could no longer doubt that here this most glorious of flowering shrubs is genuinely indigenous."

They made their headquarters at Siku, the one little Chinese town of the district, nestling at the foot of the high hills. Here they spent a peaceful spring, but there was always fear of trouble with the Tibetan monks of Chago, a nearby monastery, and of meeting a brigand, called the White Wolf, who had raised himself so near the top of his profession that he was almost called general. But on the whole they were very successful in this little area, which they worked thoroughly during May and returned to in August for the seed-harvest.

In between they visited one of the drier areas of the main Min-shan range, due west of Minchow. This was during the short wet season when this desolate country does produce its share of herbs for a very few weeks. As Farrer said it was a range of extremes, with mile after mile of enormous rolling downs, covered even in the rainy season with miserably poor herbage, and then, "mountains, stretching across the world from easterly to westerly in one unbroken rank of impregnable eighteen-thousand-foot dolomite needles, crags, castles and pinnacles."

Because of the war few of Farrer's plants from either 1914 or 1915 survive in cultivation, but what do still exist are worthy garden plants. Here are some of them:

Allium Farreri.

Berberis dasystachya.

Buddleia alternifolia, first found in 1875 in the same neighbourhood by Dr. Piasetski. Farrer wrote: "It sweeps in long streaming cascades from all the loess cliffs about Nain Dzai, like a gracious small-leaved weeping-willow when it is not in flower, and a sheer waterfall of soft purple when it is."

Buddleia nanhoensis.

Meconopsis quintuplinervia, introduced to St. Petersburg by Przewalski in 1872, but Farrer's was the main introduction.

P.H.C.

M

Lilium leucanthum var. *centifolium* (*L. centifolium*) and *Duchartrei* (*Farreri*).

Geranium Farreri.

Gentiana Farreri and *G. hexaphylla*. The former was collected in 1914 as seed of the latter, although Farrer did not see the flowers of *Gentiana Farreri* until 1915.

Viburnum fragrans.

After wintering in Lanchow they went north-west in the direction of the Koko-nor as far as Sining when they struck north to the Ta-tung alps, this time Przewalski's country to which he returned time and again. It is difficult to see why he was so attracted by this area. Farrer found the flora poor compared with that of the Siku hills, and was disappointed, although he tries to make the most of it in *The Rainbow Bridge*. In these dull hills he found a number of *Primulas* of which he sent home seed, but they have all long since disappeared from cultivation, as have those of his first year's collecting. In fact the only three plants of garden importance which he was the first to introduce from the Ta-tung alps and which are still with us are *Aster Farreri*, the delightful Three-penny-Bit Rose, *Rosa Farreri*, and the sweet-scented Edelweiss, *Leontopodium haplophylloides*, usually cultivated under the name of *L. aloysiodorus*.

Possibly, if the war had not intervened, his Kansu expedition might have given us a number of new and permanent additions to our garden plants, but it is doubtful. Kansu, with the exception of Tebbu-land and a few scattered areas, is lacking in interesting woody plants, and high alpenes, however skilfully grown, have a habit of dying in cultivation after flowering without leaving a younger generation behind them. Farrer afterwards admitted that the flora so far north could not compare with that farther south along the same border.

When Farrer arrived home, all ideas of gardening disappeared in the throes of war. He joined the Ministry of Information. His only relaxation was writing. *On the Eaves of the World* and *The Rainbow Bridge* were written between 1916 and

1918, and the proof sheets of *The English Rock Garden* were corrected and added to at some length. But the moment the war was over, which coincided with an operation for appendicitis, he was off again. This time I was his companion. What Farrer really fancied was Wilson's country in western Hupeh and Szechuan, but this was quite out of the question. Yunnan was being systematically covered by George Forrest. Nepal, on which he had also set his heart, was impossible. Nothing would have induced him to go back to Kansu and north China. All that was left was Upper Burma, at that time still with large blanks to explore among the high ranges on the Chinese frontier and in the extreme north.

The first year, 1919, we chose Hpimaw as our base, a military police post on a spur of the frontier range about 150 miles north of Myitkina the railhead in Upper Burma. Being in the monsoon area this range possesses a large and varied flora, but excepting plants from the high tops, between 11,000 and 14,000 feet, many are of very doubtful hardiness, some of them too soft even for Cornish gardens.

We spent the whole season from March to mid-November in working as thoroughly as possible about 40 miles of that range. It is difficult to do more owing to the thickness of the rain forest in the lower altitudes and the bamboo scrub higher up.

Most of the plants we sent home have now disappeared, but here again a few of importance survive. Among them are *Rhododendron sperabile*, *R. calostrotum* and *R. caloxanthum*, a new Juniper, at the moment called *J. Coxii*, and what is probably the best of the *Nomocharis*, *N. Farreri*, which is still listed usually as *N. pardanthina* var. *Farreri*.

When I had to return home in the winter of 1919-20 Farrer spent a few months at Maymyo. He then travelled up the western branch of the Irrawaddy, the Mali-hka, to Putao or Fort Hertz, and struck due east again to explore the frontier range about 120 miles north of where we were the year before. The reason for this long detour is the difficulty of the country up the N'mai-hka north of where we left it to go to Hpimaw.

This year Farrer was in far wilder country with, if anything, an even more impossible climate. It sapped his strength and his vitality. He died on October 17th, 1920. He had been able to collect herbarium material of a very fine set of plants. He was even in the middle of the seed harvest when he died: in one of his last letters to me he described the innumerable paper trays that he had round his hut, trying to get the capsules dry in that land of everlasting rain and mist. The dried material came home, but the seed harvest was lost.

From what we have learnt from his dried material and from other collectors the flora of the three valleys and passes in which he worked, the Chawchi, the Moku-ji, and the Shing Hong, is not only rich but extremely spectacular, although such is the humidity and lack of sunshine that it is very doubtful if much would survive our drier and more austere climate except, again, those plants from the high tops. It is the country of *Primula sonchifolia*, as indeed is Hpimaw, and of *P. Agleniana*, probably the finest of all the Nivalis group. It is the home of *Nomocharis basilissa*, the scarlet *Nomocharis*, and of about another four species. It is the country of *Rhododendron Kyawi*, which we also found at Hpimaw, *R. aperantum*, *R. chaetomallum* and *R. charitopes*. But you will note that no popular garden plants come from that range. Many will grow in the British Isles, but none with the abandon that must go with popularity.

It is useless to speculate on what Farrer would have done had he lived. Possibly he would have gone on collecting, in the Himalayas? Probably he would have retired from active work and taken more and more to writing.

I cannot do better than quote a paragraph I wrote fifteen years ago in the introduction to *The Plant Introductions of Reginald Farrer*: "Even after the lapse of eleven years I have a vivid memory of Farrer in the hills, his stocky figure clad in khaki shorts and shirt, tieless and collarless, a faded topee on his head, old boots, and stockings that gradually slipped down and clung about his ankles as the day wore on. The bustle of the early start; the constant use of the field-glasses

which always hung around his neck; the discussions, very one-sided owing to my ignorance, about the value and relationship of the various plants; his intense satisfaction when a plant was once in the collecting tin and was found worthy; his grunt of disapproval when it was worthless; the luncheon interval with its cold goat rissole and slab chocolate; his enjoyment of our evening tot of rum, a necessity in the rains; and, above all, his indomitable energy that never spared a frame which was hardly built for long days of searching and climbing. All these, I say, are as fresh to me as if they had happened yesterday." And I can say the same fifteen years later.

He may have been too much inclined to clothe plants with merits they hardly possessed due to his unbounded enthusiasm. A good example is his description of *Omphalogramma vincaeflorum*, the best known of those curious cousins of the *Primula*: "I was half-paralysed with excitement, but it seemed almost in derision that those stately blue violets blazed down upon me here and there from ledges wholly unattainable, and seemed to mock me with the golden twinkle of their central pointil of stamens, which adds so much expression to that already elfish countenance; for this opens first of all as a regular, small, flat star of deepest violet velvet, and then swells and expands and retorts and protrudes until it has developed the full pouting eccentricity of its clear purple maturity."

That is a glorified picture, a picture seen through the rosier of spectacles, of a charming but not very spectacular plant. If you saw it without knowing Farrer's description, you would remark on its charm. If you read the description first, you would be disappointed.

But make no mistake, Farrer revived horticulture by his picturesque and dashing enthusiasm at a time when there was great danger of it again falling into a dignified and somnolent rut. Even to-day his spirit helps to keep up its vitality.

3

Frank Kingdon Ward

Frank Kingdon Ward is the doyen of all plant collectors. No other has been in the field with hardly a break over so long a period.

Every collector has his own favourite method of working. As has been pointed out before, Forrest, Rock, and, to a lesser extent, Wilson, believed in bulk collection; with as many men as possible they tried to cover the maximum amount of ground each season. Not so Kingdon Ward; he, along with Farrer, has always believed in the personal factor. He has himself seen growing what has been collected under his name and number. Later in the year he has returned and collected his own seed. Occasionally he has had a European companion, but except on rare occasions all his collecting has been done by himself.

This solitary method has certain advantages, and one or two disadvantages. The collector himself sees every plant *in situ*; thus he has a clear idea of situation, local conditions and appearance which he can communicate in his field notes better than the collector who has to rely on native descriptions. Also he is more certain that the seed which he collects comes from particular plants which he has spotted when in flower. If a mistake is made over seed, he has only himself to blame; there is none of that little carking shadow of doubt that a native will often collect a weed because it is nearer the roadside.

The disadvantages are that much less ground can be covered by one collector than by a dozen. And secondly, that a seed collector cannot be in more than one place at the same time. Seeds, however, remain in their capsules much longer than is commonly supposed, especially when there is a heavy snowfall.

There is something to be said for both methods.

F. Kingdon Ward is the son of the late Harry Marshall Ward, F.R.S., Professor of Botany at the University of Cambridge from 1896 to 1906. Previously he had been for ten years Professor of Botany at the Royal Indian Engineering College, Cooper's Hill, and the son, while a child, frequently met forest officers returned from India and Burma. From them he learnt, at an impressionable age, of the romance of the Brahmaputra and other great rivers of the East. With such a botanical background it is little wonder that the son became interested in plant collecting.

Kingdon Ward went up to Christ's College, Cambridge, with an entrance scholarship in Natural Science in October, 1904. He took honours in Natural Science Tripos in 1906, and early in 1907 went out to Shanghai as a schoolmaster with a three-year appointment. After two years, however, he left to join the late Malcolm P. Anderson on a journey across China during 1909-1910.

In the next year the nursery firm of Bees Ltd. of Liverpool, then owned by A. K. Bulley, who also started off George Forrest as a collector, engaged Ward to undertake an expedition in north-west Yunnan.

For future reference and as a matter of interest for those who are interested in geography, a list is given of Kingdon Ward's expeditions. It would have been easier if they could have been marked on a map, but the number of them and the many times he crossed and recrossed his own previous routes makes a map of this kind a matter of extreme technical difficulty. Almost all the names mentioned are marked on the map on p. 153.

1911.—Tengueh, the first large town in Yunnan after leaving Bhamo in Upper Burma—Tali—Weihsi—Tseku on the Mekong to Atuntze then to Menkong—back to the Mekong by way of the Doker-la—up to Atuntze—then north-eastwards to Mojing on the Yangtze—westwards to Tsa-lei before striking north

- to Batang—back along the same road before going again to the north-west to Garthok in Tibet—then south-west to the Mekong—down the Mekong with several detours—back to Tengueh.
- 1913.—Myitkina—Tengueh—Tali—Lichiang—Chungtien Plateau—Atuntze—Doker-la—then north to Ka-gwrpu—Bei-ma-shan—north-east to the Tibetan portion of the Mekong-Salween divide in Tsarong—down the Salween—then across the Salween-N'mai-hka divide almost down to the Taron (the upper N'mai-hka)—back via Pitu-la to Atuntze.
- 1914.—Myitkina—Hpimaw—Feng-shwe-ling—Imaw Bum—Wulaw Pass—Shingrup-chet—Fort Hertz—Myitkina.
- 1919.—Imaw Bum—Hpimaw.
- 1921.—Tali-fu—Lichiang—Yungning—Muli with a side-trip into Szechuan—back via Tengueh and Bhamo.
- 1922.—Bhamo—Tengueh—Tali—Yungning—Muli—Lichiang—Kari Pass—Bei-ma-shan—Atuntze—Yakaloz—across the Mekong-Salween divide and south-west to Chamutong—across to the Taron by the Gomba-la and Taru-tra to the Nam Tamai, a tributary of the N'mai-hka—Fort Hertz—Myitkina.
- 1924.—Sikkim (outside the territory of this volume)—Phari—Gyantze—Tsangpo valley—Tsangpo Gorge—Bhutan—India.
- 1926.—Myitkina—Fort Hertz—Nam Tamai—Seinghku—Dipluk-la—Lohit valley—then to Sadiya in Assam.
- 1928.—Mishmi Hills (outside our territory).
- 1929.—French Indo-China (outside our territory).
- 1930-1.—Myitkina—Fort Hertz—Nam Tamai—Adung valley—Namni-la in a corner of Tibet—return the same route.
- 1933.—Sadiya—Lohit valley—Rima—Rong-tö valley—Shugden Comba—Salween—Rong-tö valley—pass into the top of the Delei valley—Lohit—Sadiya.
- 1935.—Tibet between lat. 28-31 and long. 92-95.

1937.—Myitkina—Fort Hertz—Nam Tamai—Adung valley—Gamlang valley—Kakapo Razi—back by the same route.

1938.—Assam Himalaya.

1938-9.—Myitkina—Htawgaw—Imaw Bum—Hpimaw—Panwa pass—Hpare pass—back to Myitkina.

Over and over again in his books dealing with these areas Ward draws attention to the extraordinary desolation caused by the absence of animal life. It feels as if the vigour of plant growth in these rain forests was such as to stifle and blot out all other kinds of life.

“Perhaps the most depressing feature of these forests is the immense silence which pervades them; it is as if such dim, wet solitudes oppressed animal life rather than holding out promise of shelter and food, for birds are quite rare, and we see no animals larger than voles and mice—not even a squirrel.”

This feeling is typical of the rain forest that lies from 3000 to 7000 feet in most of the hills of Upper Burma and the nearby ranges that feel the full effect of the south-west monsoon. These forests consist almost entirely of hardwoods and contain little of value to the gardener. It is above 8000 feet that the mixed woods with Rhododendrons, Michelias, Magnolias and so on are to be found. Then above that again Bamboo scrub with medium-sized Rhododendrons and glades with Primulas and Meconopsis.

About 11,000 feet the Bamboo begins to disappear. In its place are thickets of dwarf Rhododendrons, groups of Berberis and other low-growing shrubs, mixed with wide expanses of alpine meadow.

You will note the difference in vegetation between the Lichiang range and the Burmese mountains, the chief differences being the almost impenetrable rain forest and the very large belts of dwarf Bamboo in the latter which are more or less absent in the former.

Although possibly the 1924 expedition when Ward explored

the famous Tsangpo Gorge is the best known, and, perhaps, the most spectacular of his journeys, I am not sure that the first plant collecting trip of 1911 is not the most remarkable. Together with that of 1913 it is probably the most thorough exploration of the upper Mekong and Salween Rivers that has been done so far: in addition, very few British travellers have been in the area south of Batang, lying between lat. 29° and 30° north.

As so often occurred there were rumours of trouble on the borders, which in this case proved of little importance; but Ward had to travel fast and covered the 180 mountainous miles from Atuntze to Batang in six days, very fast travelling in these hills.

From the point of view of geographical knowledge the trips of 1911 and 1913 are extremely valuable. In his first book, *The Land of the Blue Poppy*, Ward has given us what is one of the best accounts of the neighbourhood of the upper Mekong and Salween that exists. This corner of Yunnan is full of geographical and climatic conundrums, difficult yet not impossible of explanation.

A. K. Bulley at that time was not interested in trees and shrubs. His instructions to Ward were to collect alpinas and herbaceous plants. The result was that the botanical results were not of the greatest importance. But this preliminary skirmish, as it were, showed Ward more than anything else where to go in future for quicker and better results. He had no wish to encroach on the territories which were being so thoroughly worked by Forrest, Handel Mazzetti and later by Rock. So on the whole he has turned his face more towards Upper Burma, the frontier ranges between Burma and Assam, south-eastern Tibet and the Assam Himalaya, the botanical exploration of all of which he has made peculiarly his own.

In this respect he has been more than wise in limiting himself to the personal style of collecting, working more often than not entirely single-handed. In Yunnan, whether the influence of the Chinese Government is paramount or not, Chinamen or tribes with a completely Chinese outlook have

filtered into most habitable valleys among the hills. Thus transport and provisions are never very far away. They may not be at one's beck and call, but it is almost always possible to travel with a fairly large personnel without any acute discomfort from lack of provisions or fodder for the beasts.

Not so where Ward has travelled so extensively. South-eastern Tibet is as underpopulated as the rest of the country, while conditions in Upper Burma deteriorate the farther one goes north, until in the Nam Tamai and Adung valley district there is mile upon mile and wooded valley after wooded valley almost completely uninhabited.

In addition to the lack of coolie labour for transport, such inhabitants as there are suffer from semi-starvation throughout most of their lives. In many places they have no food to spare, and it is impossible to buy provisions through week upon week of travel. The consequence is that it is next to impossible to move about such a country with a large following. The fewer mouths there are to feed during such an expedition the more mobile it will be—and the more successful in consequence.

During 1913 Ward spent most of his time again exploring the Mekong and the Salween. He discovered that in the three parallel ranges constituting the Yangtze-Mekong, Mekong-Salween and Salween-Irrawaddy divides, the highest peaks occur on transverse lines. Thus the Bei-ma-shan group, on the Yangtze-Mekong, stand opposite the Ka-gwr-bu group on the Mekong-Salween, and the latter is nearly opposite Gomba-la on the Salween-Irrawaddy.

In his book on this year's travel, *The Mystery Rivers of Tibet*, Ward describes particularly the group of mountains called Ka-gwr-bu, or Ka-karpo in some maps. Most gardeners, who are interested enough to look at the place names from which Rhododendrons and Primulas come, will recognise this name, but few realise that it is the main massif in the divide, a succession of glittering pyramidal peaks.

Later Ward crossed the Mekong and explored the parallel group of Bei-ma-shan before returning to Atuntze. Then he

went north-west into south-eastern Tibet where he visited Pitu on the Yu-chu, a tributary of the Salween. Near there he met Père Genestier, one of the French missionaries who bury themselves for years on end in some completely out-of-the-way place.

Ward tried his best to reach the Taron, or Upper M'mai-hka, but on this occasion was unable to do so. He again reached Pitu, but at this time there was serious trouble brewing between Tibet and China. The Tibetans of Tsarong were quite polite to Ward but were adamant that he could stay no longer in their country. Reluctantly he travelled south to Atuntze on his way back to civilisation.

1914 found Ward back in Burma. This time he confined his work to the frontier range between Upper Burma and China. He made Hpimaw his headquarters, as did Farrer five years later. On this occasion Ward's greatest feat was to climb Imaw Bum. This is a more or less isolated peak not actually belonging to but opposite the main frontier range. It is 13,370 feet. Apart from possessing an interesting flora, it is the home of large numbers of that curious beast, the Takin.

Later he went north by a route parallel but inside the frontier range. During this trip he had to cross a subsidiary pass called the Wulaw, extremely difficult to get to and with a particularly vile climate. Ward wrote of it: "In winter these mountains are covered under deep snow and it must be bitterly cold here for months. I have never seen even in Yunnan a more wonderful place for flowers than Wulaw, nor one more difficult of access, nor more hedged round with tortures for those who would brave its terrors. It will defy the collector, and guard its treasures long, for I hardly think a white man could spend a season there and live."

From there he dropped down the Laking River to the N'mai-hka and made his way north up the river bank until he crossed over the range between the N'mai-hka and the Mali-hka by way of the Shingrup-chet, and reached Fort Hertz a sick man, entirely defeated by the horrible climate.

In 1919 Ward again tackled Imaw Bum, this time exploring

it and its immediate neighbourhood with great thoroughness. During that summer he came and spent a few days with Farrer and me at Hpimaw, a visit that we thoroughly enjoyed.

In 1921 he was back again in his Yunnan hunting grounds, Lichiang, Yungning and the country across the Yangtze, Muli and a bit of country in Szechuan to the east, and back again. In 1922 the Yungning, Muli, Lichiang trip was repeated. But then he swung north-west, crossed the Kari pass, visited Atuntze, went north into Tsarong as far as Pitu and Damyon before returning to Tseku with the object of again attempting to reach the Taron and, if possible, go on to Fort Hertz and down to Myitkina by way of the Mali-hka.

This time he was absolutely successful. The Salween-Taron divide is much more serrated here than is the Salween-N'mai-hka divide farther south near Hpimaw and the Chimili. Ward wrote of it: "The crest of the Taron divide, hacked about like a jigsaw puzzle, showed up sharply against the pure blue of the sky. Towards the northern end rose the massive bulk of the Gomba-la monarch of the range, a lone snow-peak amidst a desolation of moraine and scree."

Ward's route from Tseku ran over a spur of the Gomba-la down to the Taron, then across another range, the Taru-tra, to the Nam Tamai and so through the jungle to Fort Hertz. For the last few days before Fort Hertz the journey was a nightmare owing to a very serious attack of fever. This prevented him from accomplishing the second half of his journey, namely from Fort Hertz to Assam, but for a sick man what he had done was quite sufficient.

The 1924 trip took place entirely outside our territory. It was during this year that he explored the famous Tsangpo gorge.

In 1926 he accomplished the second part of the journey planned when illness had stopped him in 1922; he went from Burma to Assam. From Fort Hertz he went back to the Nam Tamai and then on to the Lohit valley by way of the Dipluk-la. This was entirely virgin country. The valley of the Nam Tamai and the lowlands are so heavily jungled and with such

a wet enervating climate that much of the country is completely uninhabited. When the divide is reached, so the climate improves and the country becomes much drier. Ward has told how one can actually see this phenomenon:

“As I ascended towards the crest of the main watershed which separates the Irrawady from the Lohit the climate became drier. Even the flora showed this. More conclusive was the weather, which I could see for myself improved towards the top of the valley. On several occasions afterwards, both in June and July when climbing above 13,000 feet, in bright sunshine, I looked back, like Lot’s wife, and saw a pillar of cloud by day hanging over my camp. But the mist bank stopped short there at 11,000 feet, as though held back by some invisible barrier—really the dry air sweeping over the pass off the plateau. . . .

“The range then was a climatic barrier of the first importance—was, in fact, itself a part of the great rain screen which separates the wet hills of the frontier from the dead heart of Asia.”

Those two paragraphs give an excellent explanation why so many of the plants of Upper Burma, irrespective of the height at which they are collected, do not take kindly to cultivation. No man in his senses would garden for pleasure in such an indescribably wet blanket. With all the climatic vagaries of the British Isles we cannot even approximate the degree of moisture that invariably exists in these hills. The actual rainfall is exceeded in many parts of the world, but in Upper Burma rain or no rain, the air is almost always at saturation point.

Ward was enchanted with the flora on the Tibetan side with conifer woods and great breaks of *Rhododendrons* interspersed with shady meadows filled with *Primulas* and *Meconopsis*.

From Rima in the extreme south-east corner of Tibet, Ward returned to Fort Hertz, a bad journey as his two servants

deserted, and this in a part of the country that was almost uninhabited. After picking up fresh servants and a supply of provisions he returned to the Nam Tamai to collect seed, crossed over to the Lohit and so down to Sadiya.

So taken was Ward with the flora and general conditions of the Assam and Tibet side of the frontier range with Burma that he made a further exploring trip among the Mishmi hills the following year.

In 1929 he was in French Indo-China. In 1930-31 he was again in the Nam Tamai valley, then across to South-east Tibet in the Adung valley and back again by the same route.

In 1933 and 1935 he made further extensive explorations in south-east Tibet. In 1937 he was back again in his hunting ground north-west of Fort Hertz, the Nam Tamai and the Adung valley; but this time he went farther north and visited Ka-karpo Razi at the head of the Gamlang valley before returning by the same route.

In 1938 he was again in the Assam Himalaya; and if that were not sufficient he returned in 1939 from accompanying an American expedition to the Burmese-Chinese frontier range farther south, country that he knew well, Htawgaw, Imaw Bum, Hpimaw and the lower passes not so far north of Myitkina, the Panwa and the Hpare.

As Ward once wrote, it is his profession to collect seeds and herbarium material, but the real work of exploration is his hobby. He is, and always has been, much more than a plant collector. He tells me that he is prouder of the Royal Medal of the Royal Geographical Society and the Livingstone Medal of the Scottish Royal Geographical Society than of his three gold medals for horticulture. There is no doubt that pure exploration is his first love, but, alas, it cannot be commercialised and one cannot live by exploration alone. Working usually single-handed, as he did, the tale of new plants introduced by him cannot be as large as in the case of others who employed a large staff of native collectors. Nevertheless his plants make up in general popularity what they may lack

in numbers, for do they not include *Meconopsis betonicifolia* (the Blue Poppy) and *Primula Florindae*.

Here is a list of some of his better known introductions :

Acer Wardii.

Berberis hypokerina, calliantha.

Cotoneaster Wardii, conspicua.

Cyananthus lobatus var. *insignis, Wardii*.

Gentiana gilvostriata.

Gaultheria Wardii.

Lilium Wardii.

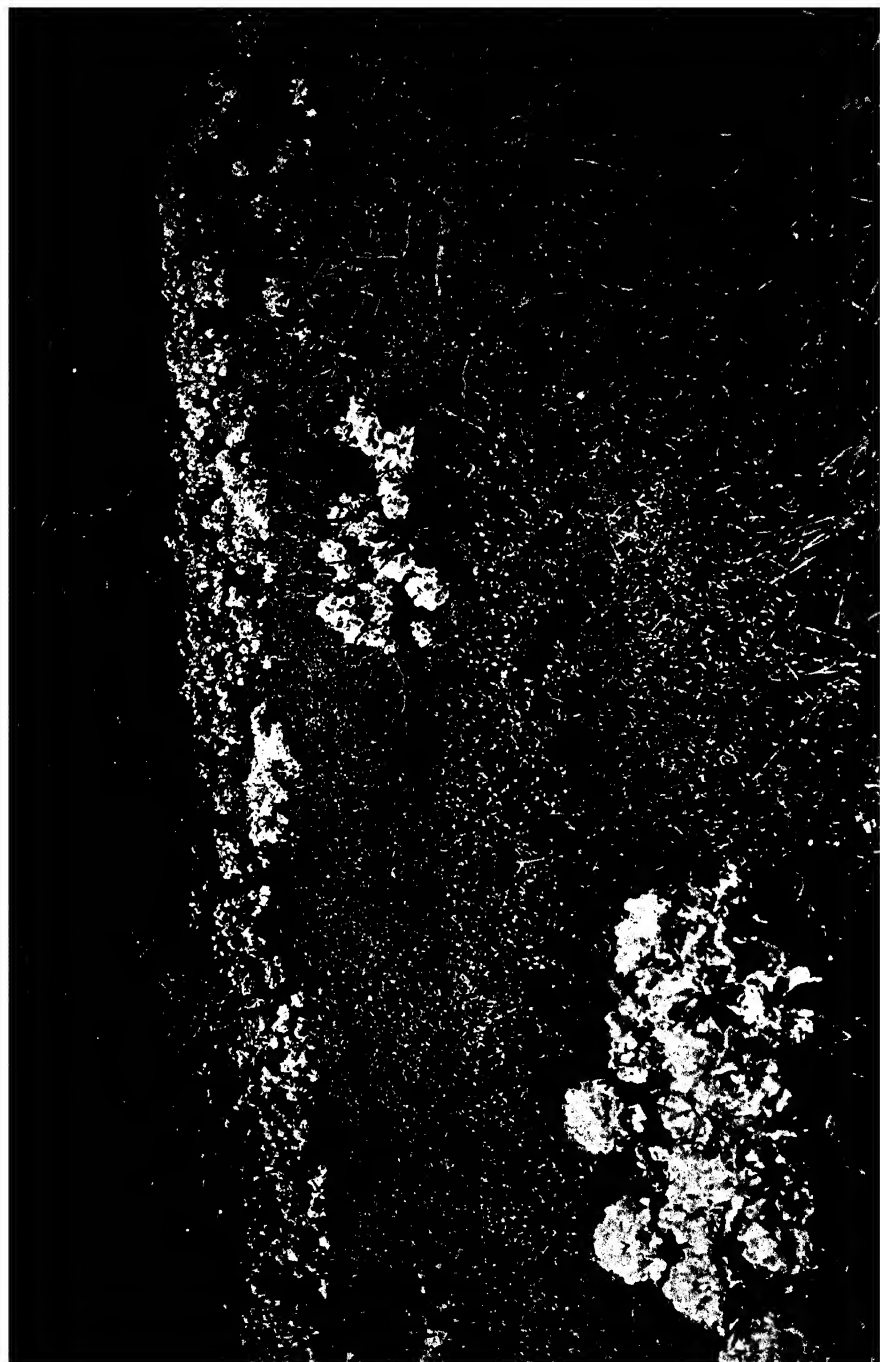
Meconopsis betonicifolia, violacea.

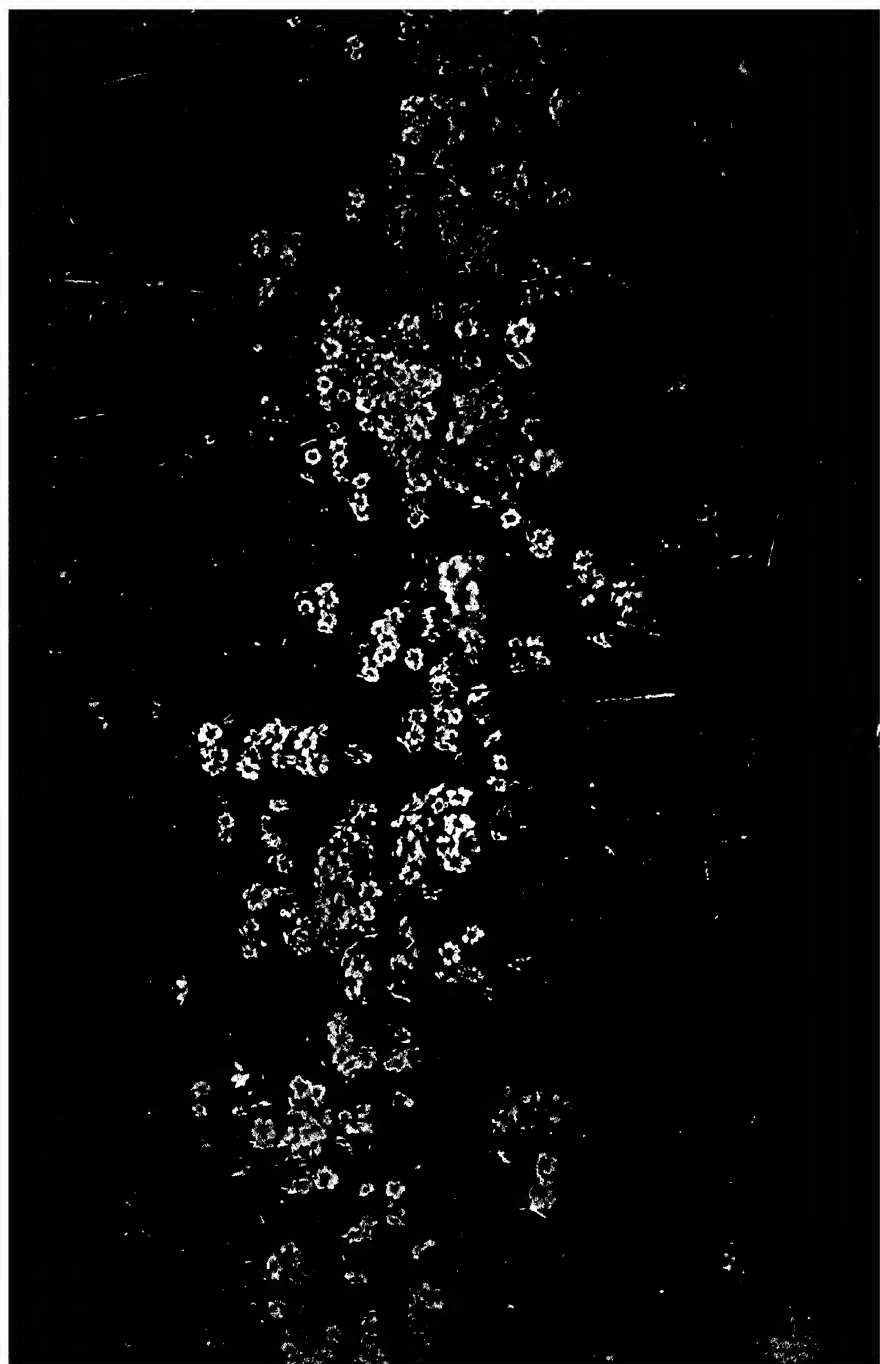
Primula alpicola, burmanica, Florindae, chungensis.

Rhododendron aperantum, calostrotum, chryseum, facetum, imperator, mallotum, megacalyx, myrtilloides, niphargum, pemakoense, tephropeplum, tsangpoense, Wardii, venator.

The latest Britisher to collect seriously in China is Herbert Stevens of Tring. At the end of 1928 an American expedition was organised with the principal object of hunting for the Giant Panda. This expedition was made possible by the generous support of Mr. William V. Kelley, and consisted of three divisions, what might be called the hunters consisting of Colonel Theodore Roosevelt, Major Kermit Roosevelt and C. Sudam Cutting, three naturalists under Harold J. Coolidge, Jr., of whom Kingdon Ward was one, to collect in Indo-China, and Herbert Stevens who worked intensively and carefully in western China.

Stevens accompanied the Roosevelts up the Irrawaddy as far as the Burmese-Chinese frontier. On January 5th, 1929, he continued northward from Tengyueh with his own caravan. He spent the whole of February collecting in the Lichiang bend before moving north into Szechuan. After spending the greater part of May in Wushi in the hills south of Tatsien-lu, he worked in various directions with the latter town as his centre, first south to Ulongkong, then north-west





to Kwanchai, and finally towards the north-east and Mupin before descending into the lower country and Kiating-fu. There he ceased collecting and descended the Yangtze to Shanghai.

This expedition enriched the Field Museum at Chicago by more than 2400 specimens. Naturally these were purely herbarium, as he missed the seed harvest.

4

American Collectors

Until the last few years, horticulture in the United States has developed on rather stereotyped lines, due more to the fact that there had for long been a general impression that the climate of much of the country was against the cultivation of many exotics. Even in the north-west, where conditions more nearly approach those of the British Isles, keen gardeners were slow to realise that many plants from Eastern Asia were quite suitable for their gardens.

The consequence of this neglect has been that what little demand there has been by American gardeners has been satisfied by European nurseries. Within the last few years demand has tended to outrun supply and the United States nursery trade has shown an increasing interest, but this has come too late to influence American plant collectors to visit China owing to the unsettled state of that country.

Thus in the past American collecting has been limited to that organised by the United States Department of Agriculture and certain institutions, such as the Arnold Arboretum and the Field Museum of Natural History in Chicago. In turn this institutional collecting, as it might be termed, has limited severely the class of collecting: the Department of Agriculture, for instance, was interested almost entirely in plants of economic value, while the Arnold Arboretum specialised in woody plants.

P.H.C.

N

XXIV—THIS COPPER IS THE NATURAL HOME OF MANY PRIMULAS. IN THIS CASE
P. FOISSONII

The Department of Agriculture were lucky to choose Frank N. Meyer as their first important collector in Eastern Asia.

Meyer was of Dutch birth. From childhood he had always been interested in plants, so much so that by his own exertions he became assistant to the great Hugo de Vries, no small undertaking with that very exacting botanist. But his passion for travel overcame any desire for steady work in a botanical institution. He was one of the world's greatest hikers, from the sheer love of it. Throughout his life he preferred using his feet to any other method of conveyance.

He was exploring the southern United States and northern Mexico on foot when he came under the notice of the United States Department of Agriculture in 1905. At that time Dr. David Fairchild was on the lookout for someone who would be prepared to undertake extensive explorations in China, principally for the purpose of introducing new varieties and species of economic plants of value in the extremely varied conditions to be found throughout the United States. Meyer accepted such a task with joy and began a series of expeditions, mostly on foot, that only ended with his death by drowning in the Yangtze on June 1st, 1918.

It is unfortunate that much of Meyer's work has been forgotten in comparison to the more showy introductions of other collectors who specialised more in ornamental than in economic plants. Meyer was not greatly interested in the herbarium specimen, nor even in the garden plant, although we owe to him our present supplies of such good garden plants as *Euonymus Bungeanus*, *Actinidia kolomikta*, and *Rosa xanthina*, while he was the first collector to introduce *Kolkwitzia amabilis* to the United States where it is now one of the most popular of flowering shrubs.

Meyer was one of those most useful individuals, a man with a passion for infinite patience. He was a stickler for detail, and was tenacious to a remarkable degree in tracking a fine variety to the centre of its cultivation, not such an easy task in pre-war China as one might imagine.

"The last day of the year found us on the road in search of the famous Peking pear, for which I have been looking ever since I came to China and for which fruit I made quite a few trips in vain. I didn't strike it until New Year's Day, but then my joy was great to start the year in such a nice way. I procured a whole lot of scions from this pear and other varieties, and I would strongly recommended the Department [of Agriculture] to distribute every scion or bud not needed, and to give them to practical, successful growers only; for these pears will probably give us an entirely new strain of this fruit."

As may be expected in a collector of economic plants, his travels did not take him so much into the wilds of western China and the Tibetan Marches. Rather did he wander through the byways of the vast agricultural provinces. His first expedition lasted from September, 1905, to May, 1908. During the winter of 1905-6 he remained in and near Peking, but the early spring of 1906 found him on the Yangtze and as far south as Soochow. All that late spring and summer he wandered through Manchuria and western Korea, reaching as far north as Harbin. He was very successful in collecting good varieties of Millet, Rice and Beans of various kinds, including many strains of Soya Bean from which have been evolved some of the best varieties grown in the United States to-day.

During 1907 he travelled wide through north-east China, but his main trip was to Tsingtau and the Lau-shan Mountains to the west of Tsingtau, which had rarely been explored by Europeans before. Early in February, 1908, he spent a few weeks in the Wu-tai-shan Mountains.

The introductions from this first expedition were important chiefly in economic plants but also in those of value to gardens and arboretums, *Acer ginnala*, *Prunus tomentosa*, *Aesculus chinensis*, *Viburnum macrocephalum*, *Syringa villosa* and *S. Meyer*, and *Juniperus squamata* var. *Meyer*.

The second expedition from 1909 to 1912 was through Russian and Chinese Turkestan, and thus is outside the scope

of this volume, but he was particularly successful in introducing seeds of forage crops of very hardy strains.

In 1913 he began his third expedition by spending the first collecting season in Inner Mongolia and the country round Kalgan. Early in 1914 he visited Sian-fu and made some short trips into the Tsin-ling Mountains. Later in the summer he again travelled extensively in Shansi and Shensi, ending up in Kansu when he visited Farrer's country (he was in Siku on November 10th and Minchow on November 22nd) and spent Christmas and New Year at Lanchow. He then wandered slowly eastwards by Sian-fu and Honan, returning to Peking on February 4th, 1915.

You will notice that Meyer was no respecter of seasons, nor was he a fair-weather traveller. This out-of-season travelling was of course an advantage to a man who was constantly on the lookout for grain seeds and fruit trees from which scions could immediately be taken, but it did not aid him in recognising ornamental plants; for instance, his sojourn in south-west Kansu was in November and December when not a flower was to be seen. The result of this winter travel was the collection and introduction only of such woody plants with fruits that were either stored by the natives or hung long on the trees, two or three Peaches and Almonds, two wild Plums, *Loniceras* and *Euonymus*, no doubt a useful but rather one-sided collection.

In the autumn of 1916 he started off on his fourth and last expedition, spending the winter in and around Peking. In March he travelled overland to Hankow. From there he left by boat for Ichang, where he remained for almost a year, using it as a centre for extensive work in Hupeh.

On June 1st, 1918, his body was found in the Yangtze between An-king and Wu-hu. He was on his way to Shanghai and probably died from drowning. So ended a remarkable man. To most gardeners he is not even a name, but he has done more towards helping the economic life of a country than most plant collectors, and his name should be a household word among American farmers.

Several famous American horticulturists and botanists have made individual trips to the Far East, among them Professor Sargent, who limited himself to Japan, and Professor Liberty Hyde Bailey of Ithaca who collected in Kiangsi, Hupeh and Honan during the spring and summer of 1917. He collected cultivated plants as well as the wild flora.

From the point of view of the garden much the most important collector working from the United States since the days of E. H. Wilson was Joseph J. Rock.

Rock was born in Vienna about 1879. Of all those who have collected plants in China he has probably been the best fitted for such work. Not only was he a trained botanist, but as a boy he showed extraordinary aptitude for languages, and among others learned Chinese thoroughly. In 1907 he was appointed to the curious dual post of Professor of Botany and of Chinese in the College of Hawaii. This post he held until 1920. It certainly enhanced his reputation as a botanist; his work on the native flora of the islands was excellent.

In 1920 Rock entered the employment of the United States Department of Agriculture. Late in the same year he was sent by them to Burma, Assam and Siam for the specific purpose of collecting information and material of *Taraktogenos Kurzii*, the tree from which is obtained Chaulmoogra oil, the drug that has been found so useful in the treatment of leprosy. Since then he has spent almost the entire time in China. When he stopped collecting, he lived either in Yunnan-fu or in Indo-China.

When his work for the Department of Agriculture finished, he remained in Yunnan on geographical work for the National Geographic Society of Washington. He continued collecting plants, not only ornamental but also economic, in particular Sweet Chestnuts in the hope of introducing an immune variety into the United States. He also collected birds and mammals.

It is difficult to check his itinerary in Yunnan accurately. He began in the extreme south-west near Henry's old hunting

ground at Szemao, and explored the watersheds of the Red and Black Rivers, also worked by Henry.

Rock has always been a rapid traveller with a remarkably keen eye for good plants. Like Forrest, he used Moso collectors from the Lichiang country, but never to the same extent. He relied much more on his own personal exertions. A good deal of his exploration in north-west Yunnan was naturally in the same mountainous country as Forrest covered, a fact which irked Forrest not a little, as he disliked people poaching on what he considered to be his own special preserves.

During 1922 Rock worked on the Shweli-Salween divide and also on the Lichiang range, where he met both Forrest and Kingdon Ward in July or August. By November he was back at Tengyueh.

In 1923 he again visited Lichiang, but afterwards struck westwards to the country west and north-west of the Yangtze Bend; Li-ti-ping and Weihsi on the Mekong-Yangtze divide; Champutong, Pei-ma-shan, and the country north almost as far as Tsarong in south-east Tibet; the Salween-Irrawaddy and Mekong-Salween divides near Londjre. This was all known country; worked over previously by Forrest and Kingdon Ward.

In January, 1924, Rock visited Muli, a little semi-independent state about 75 miles north-east of the end of the Yangtze Bend, a few square miles among great mountain ranges that would be completely unknown to all westerners if it were not that several plants have been specifically named after it. Perhaps chief among them is *Rhododendron muliense*. While Rock did not collect much on this trip to Muli, it stood him in good stead later, for he made great friends with the King, a good-natured monarch.

Immediately after Muli, Rock made a flying visit to the United States, only to start off again in late summer for China on behalf of the Arnold Arboretum and the Harvard Museum of Comparative Zoology. Previously General Pereira during one of his remarkable walks through the unknown fastnesses of western China and eastern Tibet had seen from the Tibetan

plateau a high massif, lying to the east, which he imagined might equal Mount Everest in height. This was the great Amne Machin range with peaks over 25,000 feet in height, round which the Yellow River makes one of its extraordinary sweeps. No European had ever explored this range, not even the Russians. It was known by report to be barren, but from the size of the logs that came down the Yellow River it was believed that forests of immense trees must exist somewhere in that district.

It was in this direction that Rock now aimed. He meant to travel by way of Peking so as to learn as much as possible about his goal, but the troubled politics of the capital made this impossible. So he was forced to journey by way of Indo-China, by rail to Yunnan-fu where he was able to pick up some of his collectors and servants from his previous expedition, and then northwards by way of Szechuan and Kansu, an exasperating and dangerous trip at that time owing to the unsettled state of the country and prevalence of brigandage.

Apart from the Amne Machin range and its surroundings, he wished to go even farther to the north-west and explore the Richthofen Range that forms a natural boundary between Tibet and Mongolia.

In May, 1925, he was at Choni in Farrer's country. Even there he found great difficulties owing to trouble between the Chinese Mohammedans and the other inhabitants. The Tebbus, which Farrer called the Black Tepos, are very loosely held under the sovereignty of the Prince of Choni; their country lies south and east of Choni, nearly as far as the Szechuan border and spreading over the ill-defined Tibetan march. It consists of heavily wooded ranges, largely consisting of Conifers with enormous forests of *Picea Meyer*.

Rock wasted no time. Working and travelling vigorously, he collected as much as possible in Tebbu-land in about three months, left three men there to collect seed, and started off himself for the Koko-nor district and the Amne Machin range. Crossing the Yellow River at Radja, due east of the

Amne Machin range, he found valleys near the river covered with Spruce and Juniper forest with *Meconopsis* and *Primulas* in their full glory in the glades. He and his expedition had to go warily as the Ngoloks, the loose group of Tibetan tribes that inhabit the country west of the Yellow River, are extremely unfriendly to all strangers. This absence of all intercourse with the outer world is proved by Rock's statement, "The whole region between the Yellow River and Amne Machin is one great zoological garden. Wherever I looked I saw wild animals grazing contentedly. There were various deer, wapiti, and many other animals unknown to me."

He could not reach the main range, although he saw it clearly on several occasions and was vastly impressed with its height and beauty. As one left the Yellow River, the hills and valleys became more and more rugged, until all vestige of trees was left behind.

Rock has pointed out that there is probably little of value to be found in the actual range. It is too high; the floors of the approaching valleys are more than 15,000 feet. In the Himalayas, influenced as they are by the monsoon, that would not be an excessive height, but the Amne Machin range is nearly in the centre of Asia with a completely continental climate. There is no spring and no autumn; a summer of three months and nine months of winter. It is most unlikely that any useful garden plant could come from such a rigorous home and exist under our conditions.

He thought very little of the Koko-nor: "There are snow ranges on both sides of us, but they are as bare as a rock, not a vestige of plant life is visible. The scarcest thing in this country is a tree or a bush, everything is barren, and searching for such is indeed an undertaking. The Koko-nor region is the bleakest imaginable. Cold winds blow from the north-west almost continually and my tent, elev. 10,700 ft., was nearly blown into the lake one night at 2 a.m. had my men not come speedily to my rescue. It blows a veritable gale up there, beginning at 10 p.m. and lasting until after 2 a.m.

The nomads camp at the very foot hills in sheltered nooks, but when travelling one cannot go very far off the trail, as it would consume a good deal of time every day. The Kokonor region is indeed poor picking for a botanist but rich in bird life."

From that bleak country he went to one equally empty of tree and shrub life, the two ranges on the Mongolian border, both called by the Chinese Nanshan, and on the maps the North Koko-nor and the Richthofen ranges. Rock found the mountains absolutely bare with a plain between, a sea of grass. Farther on there were forests of a small *Picea* and a *Juniper*.

The great Amne Machin range he found equally barren except in the deep valleys in which the Yellow River has cut its way in its tortuous endeavours to escape from the high plateau of Eastern Tibet.

In 1925 he had explored the Upper Tebbu country. In late summer and early autumn of 1926 he worked his way through Lower Tebbu-land. "I have never in all my life seen such magnificent scenery. If the writer of Genesis had seen the Tebbu country he would have made it the birthplace of Adam and Eve, for besides an endless variety of Conifers there are even Apple trees 40-60 feet tall but the apples are not the kind that would have tempted Eve."

Again and again he wrote what a wonderful country it was. In a letter from Choni on September 24th, 1926, he wrote:

"In the Tebbu country we found various *Hydrangeas*, *Viburnums*, many *Acer*, some huge trees, huge *Quercus*, enormous *Malus*, *Sorbus*, even *Meliosma*, a few *Koelreuteria* with large compound leaves, a species of *Padus*, a tree 60 feet tall with trunks 2 feet in diameter, glabrous glaucous leaves. . . . *Acanthopanax*, a lovely species with long drooping peduncles bearing large umbels of black fruit, the whole inflorescence being over a foot long in some individuals. There are large panicle-bearing *Aralias*, beautiful *Syringas* in the drier regions, *Ribes*, *Deutzia*, *Philadelphus*, *Caragana*,

Betula we observed four distinct species, Tilia, Cotoneaster, Juniper, Euonymus, Prunus, Lonicera, among them a tree 15-20 feet tall, with shaggy papery bark of a pale flesh colour, Jasmine, Crataegus, not the *C. pinnatifida*, Xanthoxylum, Rhododendron different from what we sent before, Populus, Salix, Rosa, Rubus, Berberis and last but not least the Abies and Picea."

This expedition proved that there was little more to be gained from the barren ranges of eastern Tibet. It also proved the value of the wooded ranges of Tebbu-land.

In 1928 Rock was again in China, for the second time under the auspices of the National Geographic Society of Washington. In addition his plants and seeds were syndicated, mostly to growers in England and the Pacific coast of the United States. During the next two years he explored much fresh country lying south of the main Lhasa road between Tatsien-lu and Batang.

While he was on his first trip to Muli he had noticed a very high range to the north-west. This was in the Konkaling district, north of the areas covered by Forrest and Kingdon Ward, lying between 100° and 100° 20' east, and 28° 20' and 28° 40' north. This consists of three main peaks each about 20,000 feet in height with their satellites. Up to 1904 this area had been under the direct control of the Tibetan Prince of Litang, but after the Chinese destroyed this control the entire country had become demoralised and the Konkaling district had become the headquarters of a doughty robber chieftain called Drashetsongpen, formerly a lama in Chungtien monastery. Owing to the latter's friendship with the King of Muli, Rock was allowed to make a tour round these mountains and explore the shoulders of the main massif, Mount Jambayang. He again made the tour to see what fresh flowers were to be seen, and was about to return for the third time in August to collect the seed harvest when Drashetsongpen wrote to the King of Muli that Rock would be murdered if he returned. After his second journey the weather had turned so bad that the local crops had been ruined. As usual the natives blamed

a stranger for wandering on the mountains and annoying the gods.

For many years a great peak has been known to exist about 50 miles south-west of Tatsien-lu. It can be seen towering above its neighbours for extraordinary distances both north and south. In clear weather it can be seen from Chengtu; Rock also saw it from the Konkaling country. As he could not return to the latter, he decided to make his way to this high peak, which is called Minya Konka, a giant of more than 25,000 feet, at that time never seen close at hand by a European although it has since been climbed by the American Emmons Expedition, and the neighbourhood explored by Professor A. Heim of Zurich, a geologist working for the Sun-yat-sen University.

As usual Rock started off from Muli where an imposing caravan was collected with the help of his friend the king. The journey to the north-east was through very difficult country, but on arrival Rock found the arduous time well worth the trouble. The range consisted of a number of peaks over 20,000 feet culminating in the magnificent pyramid of Minya Konka itself. This range is rather an exception in that part of the world, as it consists of granite. Thus the flora of the valleys and lower slopes cannot compare with the limestone formations of north-west Yunnan.

Rock has always been a most praiseworthy collector. His herbarium specimens are numerous and well prepared, while the general consensus among gardeners is that seed sent home by him has been cleaner with fewer rogues and with a better percentage of germination than that of any other collector. But he has been unfortunate in the number of new plants he has introduced. In Yunnan south and west of the Yangtze he never struck really new ground, and most of the seed sent home was only a repetition of what had been sent home by Forrest or Kingdon Ward. In the other expeditions farther north he was dogged with bad luck: for instance, in the Konkaling district he was quite unable to return for the seed harvest owing to the enmity of the population. Even from

Kansu and Tibet most of his seed harvest had been discovered before. Thus there are many fine forms of plants already known, for which we have to thank him, but little that is actually new. This is seen by the comparatively few numbers of plants that have been named after him, among them *Primula Rockii*, *Rhododendron Rockii* and *Omphalogramma Rockii*.

CHAPTER VII

European Collectors

SINCE the beginning of the century most introducers of new plants from China have been British or American. That does not mean that no collecting has been done by those of other nationalities; far from it. There has been excellent work done throughout the length and breadth of the country by a number of good botanists and collectors, but their work has necessarily been confined to dried material for herbarium purposes owing to the real lack of interest shown in new plants from the Far East among private gardeners on the continent of Europe. Lately there has been a little more enthusiasm, particularly in Scandinavia owing to the example shown by the Crown Prince of Sweden, but even now enthusiasts can be counted on the fingers of two hands.

It will be seen, therefore, that there has been no incentive for collectors from the Continent to spend much time in seed collecting. Although this volume sets out to describe those who have introduced new plants to our garden, it is impossible to ignore entirely others whose technique consists of collecting dried material that disappears into the cupboards of a herbarium only to be produced for students of systematic botany. These collectors have helped us to gain further insight into the intricacies of the Chinese flora, and so are worthy of our respect, even if they have accomplished little in the introduction of new plants.

Although the days of the great French missionary collectors are long past, yet there are a number who collected in more localised parts of the country. In their own way they are worthy followers of David and Delavay.

Père Francois Ducloux is an example. He was born at Pélussin in 1864 and left for China in 1889. Almost all his

life in the east was spent in the neighbourhood of Yunnan-fu where he ultimately became head of the missionary school. Apparently he did not commence collecting before 1897, and in 1900 sent to Paris a collection of about 250 species. Since then he has been active in sending material to the French herbariums, mostly collected near Yunnan-fu. While his special hobby ultimately became Ferns, yet he collected specimens of a number of trees, such as *Catalpa Duclouxii* and *Juglans Duclouxiana*.

Another was Père Pierre Julien Cavalerie, who was born in 1869 at Roussennac and arrived in China in 1894. He worked in the province of Kweichow, and specialised not only in the botany of that province but also in zoology of all kinds. Mosses and Ferns were his special hobby. He left the missionary service after a number of years.

Still another collector was E. E. Maire, the Pro Vicar Apostolic of Yunnan, who from about 1905 to 1916 sent various large collections of herbarium material to several European botanical institutions. These were got together in a very haphazard fashion, and, as his specimens were all unnumbered, it is extremely difficult to collate exactly what he has sent home. He also collected seed from time to time, but here again it is almost impossible to tell what he introduced.

Most of Maire's collecting was in the neighbourhood of Yunnan-fu, on the plateaus surrounding the capital, at an altitude of from 4500 to 7500 feet, but he also made several collecting trips near the town of Tong-chuan about 85 miles to the north-east of Yunnan-fu. Here the limestone hills reached a height of more than 10,000 feet. This is an area that has been little touched by Europeans. While the results of Maire's collecting trips were not of the greatest importance, although the number of specimens is large, yet he is a good example of the keenness expressed by a busy and influential missionary. The lovely *Nomacharis Mairei* was named after him.

At the other end of the country one of the earliest collectors

in this century was a German, Wilhelm Filchner, who spent from 1903 to 1905 in Western Kansu and eastern Tibet. His finest work was the exploration of the Tosu-nor and Kalam-nor, lakes near the source of the Yellow River. He collected herbarium material in that area, and also on the south flank of the Tsin-ling range as well as in the Koko-nor region in the neighbourhood of Sining-fu. Owing to the excessively desolate part of Tibet in which he collected, his collections would have had no garden value even if he had sent home seed.

A little earlier Karl Futterer explored the same areas. He also visited Liangchow to the north-east of Sining, on the edge of the Gobi Desert. Although he collected a few herbarium specimens, he was not a botanist.

The Min-shan range and the Koko-nor region has always held a spell over explorers. Apart from numerous Russians, both Farrer and Rock spent a considerable time in one part or another of that very large area. The last to be lured there was a Swedish traveller, Dr. David Hummel, who was born in 1893 at Kosta in Smaland, the homeland of Linnaeus. He originally went to China in 1927 as doctor to the Sino-Swedish expedition under Dr. Sven Hedin. During 1927-28 they went by caravan across the Gobi Desert to Urumchi, and returned to Peking in December, 1928.

Owing to civil war he could not cross Shensi as Farrer did on his way to Kansu. In March, 1930, he had to go by way of Shanghai and the Yangtze, accompanied by a young Chinese botanist, Kin-shen-Hao, a German interpreter and two Chinese boys. They reached Min-chow by way of north Szechuan on July 3rd, when the party split, Hao and another Chinese boy going north to Lanchow and then west to the Koko-nor. Hummel and the others collected in the mountainous country south-west of Minchow. This section of the Min-shan is of limestone, with gleaming white peaks rising to 14,000 feet. Woods of Spruce and Rhododendron scrub covered the lower slopes with beautiful alpine meadows higher up on the south slopes. After spending the summer

they went to Farrer's Siku in October and went back to Peking by the long route they came.

The object of this expedition was more scientific and less horticultural. The botanical collections deposited in the Riksmuseet, Stockholm, comprise about 2500 numbers. A certain amount of seed was sent home with a few novelties but nothing of garden importance.

Having finished with Kansu, we must return to Yunnan. Camillo Schneider and Handel Mazzetti both went to China at the end of 1913. Those two botanists have done a great deal towards helping us to gain a more complete knowledge of the flora of Yunnan and south-west Szechuan, and that new province called Sikang. If it had not been for the war of 1914 to 1918, their collections might have been of the greatest importance. As it was, Camillo Schneider was only in China for a little over a year, while Handel Mazzetti stayed until 1917. During these four years he continued his extensive collections, but naturally the importation of living material was quite out of the question. This expedition was arranged conjointly by the Dendrological Society of Austria and the Academy of Sciences of Vienna.

They started from Yunnan-fu early in March, 1914. Instead of going by the usual route to Tali-fu and the mountains of north-west Yunnan, they struck out into new territory by travelling almost due north, crossing the Yangtze, and reaching a tributary of the Yalung that goes under many names but is usually marked on our maps as the Amning-ho. They travelled up the east bank of this river until they reached the town of Ning-yuan which they made their headquarters for several weeks while they explored the surrounding country. One of their excursions was made due eastwards into the independent Lolo country. The hills in this area of Szechuan rarely exceed 12,000 feet and tend more to the rolling saddle-backed formation than those farther west.

Later in the spring of 1914 they moved to Yen-yuan on the west bank of the Yalung where they explored the Yalung basin. The Yalung itself runs through a deep gorge for many

miles. Here the climate is so hot and the walls of the gorge are so precipitous, that, owing to the steepness and a rainfall small for that part of the country, the flora is xerophytic and uninteresting. But some of the surrounding country is very fine with knife-edged ridges interspersed with rolling valleys. Here are forests of *Abies Delavayi* and *Tsuga yunnanensis* with every open space filled with Rhododendrons. From there they went by Yungning, crossed the Yangtze again near the top of the bend, and reached the usual goal of all Yunnan collectors, the Lichiang range. Here they met George Forrest. Schneider and Mazzetti collected together on the range until the beginning of September. Then news of the war reached them and they separated.

Schneider went to Tali-fu, and then south-west to Yungping and Yung-chang nearly on the Salween. He then saw that matters were so hopeless that he could not carry on. He returned to Yunnan-fu by a southerly route, left shortly after for Shanghai and went to America where he worked at the Arnold Arboretum for the duration of the war. Schneider's knowledge of the woody plants of China is immense, and on some genera, such as *Berberis*, he is a great authority.

Handel Mazzetti continued his botanical exploration. After Schneider had left him, he worked his way northwards up the Lichiang range and spent some time on the Chungtien plateau.

In 1915 he made a tremendous round. He began at Lichiang and then worked north by Yungning to Muli. Later he went south-west to Chungtien, past Bei-ma-shan across the Mekong to Tseku. He went still farther, up the Mekong to the Doker-la on the Mekong-Salween divide, back again to the Si-la opposite Tseku, down into the Salween valley; and then made a long journey back to Yunnan-fu for the winter.

In 1916 his wanderings were equally strenuous: to Lichiang and then to the Si-la; from there to the Salween-Irrawaddy divide and back to the Gomba-la to Tseku; then by Weihsi back to Yunnan-fu by way of Lichiang. In 1917

he wended his way slowly eastwards through the hills of Kweichow and Hunan as far as Tsangsha. In 1918 he finished his Chinese exploration in Hunan.

Handel Mazzetti gained for himself a high place among experts in the flora of China owing to his knowledge gained by personal experience. He was one of the great authorities on the phytogeography of China; in addition, he specialised in various genera, among them *Androsace* and *Lysimachia*. No doubt both Camillo Schneider and Handel Mazzetti would have introduced many new plants if circumstances had been favourable. It was the latter who found *Taiwania cryptomerioides* growing in the Salween valley, a far cry from its home in Formosa. Handel Mazzetti was killed in a motoring accident in Vienna in 1940.

About 1919 J. Hers appears on the scenes as a keen dendrologist. This Belgian was long resident in the north-central provinces. He was connected with railways from the start, and about 1922 was appointed administrator of the Lunghai Railway. It is not certain if he was always interested in Chinese trees, but his enthusiasm and interest was certainly roused by the difficulties he experienced in finding suitable timber for his railway work. With this idea of economic timbers always at the back of his mind he spent every moment he could spare during several years in exploring the most out-of-the-way forests of Honan, Kiangsu, Shensi and Kansu. Perhaps his most important work was done in the Fiu-Niu-shan and the Tien-Tai-shan, two ranges in western Honan that might almost be called continuations of the great Tsinling range of Kansu and Shensi. What astonished him most in all his explorations, which broke almost fresh ground for Europeans in central China, was the remarkable speed with which the Chinese were using up their forest reserves. Many species which had been collected formerly in definite areas were completely extinct when he searched for them a few years later.

Nevertheless in a few years he collected specimens of more than 2000 species, many of which were new. He has also

introduced a number of woody plants, among them the fine Maple, *Acer Hersii*, called after him, and *Celtis koraiensis*. He sent to Europe large quantities of seed of *Larix Principis Ruprechtii* which forms such large forests in Kansu and Manchuria.

Another important collector was Wolfgang Limpricht. He was a teacher by profession, and left Berlin in 1910 to take up the post of Docent at the German medical school for Chinese and Director of the school of languages at Shanghai. At Christmas, 1913, he retired from these positions to accompany the Stötzner expedition to Wen-shan-hsien in the Min valley in Szechuan. Shortly after their arrival he went on alone to explore what was then the extreme south-west of Szechuan, which is now included in the province of Sikang. This consists of the extremely mountainous country that lies north of the main road from Tatsien-lu to Batang.

It has always been very difficult for Europeans to get permission to travel through this area, principally because the Chinese have almost no control over the inhabitants, but by great good luck Limpricht was befriended by a General Chang, under whose protection he was able to make the journey.

He left Tatsien-lu on the 19th of June, 1914. His first objective was the great peak of Jarra, the monster of almost 25,000 feet that lies to the north-west of Tatsien-lu. He climbed to the snow line and was much impressed by the plant population in the gigantic scree that lie on its face. Many Primulas and dwarf Rhododendrons carpeted the slopes, while there were masses of the minute *Diapensia purpurea* in flower. Round a mountain tarn he found an equally varied flora. It is obvious that this is a much better area than that in the neighbourhood of Tatsien-lu. It is more than likely that many of the older plants labelled Tatsien-lu came from the Jarra district which lies not so many miles away.

Later as he approached Tibet with its far drier climate conditions changed and the flora became far poorer. Just below Dege he climbed down into the Yangtze valley in an

exceedingly dry area. He said it was just like climbing down into China again with the desiccation and the warmth.

After reaching Batang on August 18th he returned by the main road to Tatsien-lu where he heard that the war had broken out. He at once left for the east by way of the Ta-pao-shan and Chengtu and Chungking, and then down the river to Shanghai.

Limpricht was then sent to Tientsin to take the place in the German-Chinese intermediate school of a teacher called to the colours. There he remained until 1920.

During his long stay in China Limpricht was always an assiduous collector of herbarium material. Unfortunately he never introduced a live plant. The only period when he was unable to travel was during 1918 and 1919 when Germans were forbidden to move throughout China. Apart from his long trip to Szechuan, every Chinese New Year when there were four weeks' holiday, and every July and August found him on the road. Sometimes the trips were unimportant, such as that from Yunnan-fu to Tali-fu, which had been searched so many times before. Others were near the coast owing to the shortness of time at his disposal, such as Fukien, Shantung and Kiangsu. But one was of importance. In this he went into the Tsin-ling range in southern Shensi, that long stretch of hills that has been spasmodically explored from David onwards but never thoroughly examined. Limpricht went through that section called Tai-pai-shan about 120 miles west of Hsian-fu.

A great many plants have been called after him by Diels and other German botanists, but it is doubtful if he discovered many outstandingly new.

Another modern collector is R. Mell, for some time director of the German-Chinese Middle School at Canton. He collected a few plants while on a journey between Yunnan-fu and Tali-fu; but far more important is a collection of about 1000 numbers that he made in a portion of northern Kwangtung where no one had collected before. One plant, *Amorpha*

phallus Mellii, has certainly been introduced by him; there may have been others.

One of the most interesting of modern European collectors is Dr. Karl August Harald Smith, better known as Docent Harry Smith, a Swede who takes his surname from an ancestor who emigrated from Belfast to Sweden.

His first expedition to China began in 1921. In August he went to Peking and made a short trip in the Western Hills, returning to the capital for the winter which he spent in learning Chinese. That was the period when China was most disturbed by civil wars. Finding it impossible to go far afield from Peking, he went to Yunnan-fu by way of Hanoi. By mid-April conditions were sufficiently quiet to allow him to move north in company with some missionaries. They followed the main road to Ning-yuen where they were again delayed. Lolo warriors at war with the Chinese held the pass of Hsiao-ling-shan. The Chinese made a feint elsewhere; for a day or two the Lolos left the pass and the caravan with Smith and the missionaries were able to slip through into safer country.

Believing himself to be secure, Smith hurried on alone. When only a day and a half from Chengtu he was set upon and robbed of everything of value. The journey from Yunnan-fu to Chengtu had taken a month.

He again moved north and arrived at Sungpan on July 5th, 1922, where he stayed for nearly two months. He made two expeditions to Hsueh-po-ting, a holy mountain which the Chinese consider "the luck of the Chengtu plain." They claim that as long as snow covers this peak the prosperity of Chengtu and its surrounding plain is assured. It is a fairly safe prophecy, as the peak is in the neighbourhood of 22,000 feet high.

Wilson had been in the neighbourhood on several occasions, but had never been closer to the mountain than the Hsueh-shan pass on the road to Sungpan. But Smith was able to explore both the lower slopes of the mountain and the surrounding foothills. He called it a botanist's paradise, well

worth more intensive exploration. Although greatly handicapped by lack of drying paper and of help, he was able in seven days to collect about 800 species, about 300 of them new species or varieties.

From Sungpan Smith planned to go westward into Tibet, but his plans were constantly frustrated by the authorities. Fortunately he became friendly with a Tibetan, San-cho-lamo, who was a great traveller, familiar with all the local dialects and a perfect diplomat. With his aid Smith escaped one night at the end of August. They travelled unharmed west to Merge and then to Tatsien-lu by a new route. This was through the country of the little border chieftains who were at war with each other, but stopped fighting to escort the travellers on their way.

Tatsien-lu was reached on November 11th. He returned to Sweden by way of Chengtu and Peking. He had collected on this trip about 10,000 numbers, mostly of flowering plants.

In May, 1924, he returned to China. This time he went to central and south Shansi, a well administered and peaceful province, widely cultivated, but from a botanical point of view rather poor. Here he collected about 4500 numbers, representing about 1100 species. At Mien-shan he came across a large virgin forest of *Pinus Bungeana*. Early in 1925 he returned to Sweden across Siberia.

In 1934, with the aid of grants from Swedish universities and a few interested people, he was again able to visit western China. From Shanghai he went to Chungking and then by Kiating-fu to Tatsien-lu. So many species have been described as having been collected near Tatsien-lu that Smith decided to spend a considerable time in that neighbourhood, believing that its surroundings must be very rich botanically. On the contrary he found them poor. After intensive search for many species supposed to grow there, he concluded that the type-specimens had really been collected farther afield. Thus Tatsien-lu had been written on their labels merely to indicate the general region. This was a plan often followed by the French missionary collectors. In many cases it is quite im-

possible to trace an exact locality from which their plants came.

In August Smith set out to the north to Taining through very difficult country with steep hillsides and a forest limit of about 13,500 feet. He returned to Tatsien-lu by way of Mao-niu. He left Tatsien-lu on November 12th, 1934, much regretting that he had wasted so much time there. This expedition yielded about 4000 numbers.

Harry Smith's specimens are among the finest ever made, a real joy to study. They include a large number of new species, while many considerably extend the geographical ranges of species already known. For the most part they have been determined by German and Austrian botanists and listed in papers in the *Acta Horti Gotoburgensis*. Smith's introductions of new plants contain nothing of outstanding horticultural value.

He is now in charge of the botanical museum and herbarium at the University of Upsala. For long he has been engaged on a critical and detailed revision of the Asiatic Gentians.

CHAPTER VIII

THE TECHNIQUE OF PLANT INTRODUCTION

THE ACTUAL PROCESS of plant introduction from the Far East has undergone a vast change during two and a half centuries. It might have been imagined that the obvious method in the far-off past would have been by means of seed, considering the slow voyage home by the Cape of Good Hope in sailing ships with the consequent extreme variations in climate and temperature; but seed was a method that was certainly not generally employed. We have to wait until 1815 during Lord Amherst's Embassy to Peking before any, even moderate-sized, collection of seed was made, by Dr. Abel and his assistants, and on this occasion the three hundred packets collected did not reach home owing to the wreck of the ship *Alceste* on which they were being carried. Dr. Abel recalled his mortification when his precious seed-boxes were tipped up and their contents dumped into the sea to make space in a small boat for the spare linen of some officer attached to the Embassy.

There is one obvious reason for this neglect of introduction by seed, the fact that a large proportion of plants sent home from China consisted of florist flowers from Chinese nurseries. They were, of course, mere varietal forms, and so would not necessarily come true from seed, even if the seed was always viable. But that does not entirely explain the neglect of seed collecting. Many species quite capable of being introduced in the form of seed were laboriously shipped home as plants.

Almost every considerable expedition to the South Seas and China carried a working gardener, apart from any scientific staff, whose job was supposed to be the care and main-

tenance of live plants during the voyage home; and also during the voyage out, as frequently fruit trees were carried outward bound to use as a form of barter.

One of these early gardeners was David Nelson who accompanied Captain Cook on his last voyage. He was afterwards on the famous voyage of the *Bounty* under Captain Bligh when she was despatched to Tahiti to collect plants of Bread Fruit for transport and introduction to the West Indies. Nelson was among these set adrift by the mutineers and died from exposure after reaching Timor.

That he received special training as a ship's gardener is obvious from what Sir Joseph Banks wrote: "He had been regularly educated at Kew as a gardener and learned there the art of taking care of plants at sea and guarding against the many accidents to which they are liable." This shows that transport by sea was commonly practised and understood, if teaching was undertaken at the Royal Gardens. Nelson collected plants as well as looked after them. The genus *Eucalyptus* was founded on a specimen of *E. obliqua* collected by him in Van Diemen's Land while on the voyage with Captain Cook.

In China the same procedure occurred. Two professional gardeners were attached to Lord Macartney's Embassy to China of 1792, and Dr. Abel was definitely appointed naturalist as well as physician in Lord Amherst's Embassy of 1815. He had the assistance of his brother-in-law, a Mr. Poole, and another Kew gardener called Hooper. Poole, I believe, stayed on in China after the return of the mission and collected for Messrs. Barr and Brookes, the nurserymen of Ball's Pond, Newington Green.

As far as can be learned not one of these gardeners earned their pay by keeping sufficient plants alive on the voyage.

The usual procedure was for plants to be encased in boxes, often made of wooden slats. These cases were supposed to be carried on the poop of ships, where they might presumably be in the greatest shelter and get as little exposure to salt

water as possible. Before the captains of the Indiamen found that good money could be made by looking after the plants on the voyage, the cases were often carried forward or placed in the well and there left to their own devices until St. Helena hove in sight.

When the weather was fine one of the sides of the box was supposed to be removed to let in light and air, and also, if necessary, water, but this was often brackish. If the weather was dirty, a tarpaulin was supposed to be drawn over the box to keep off salt spray. If the weather was particularly bad rounding the Cape or crossing the Bay of Biscay, the cases were often heaved overboard, as they got in the way of the sailors. Is it any wonder that Dr. Livingstone wrote to Sabine from Canton that 1000 plants were lost to every one that survived the voyage home? He went on to say that as each plant cost on the average 6s. 8d., including the cost of the case, the total cost of the one survivor was excessive.

It is only fair to say that this enormous death rate was by no means entirely due to ill-treatment on shipboard. As I have said, almost all these plants came from nurseries in the Canton and Macao districts. In these cities rich Chinamen usually made contracts with these nurseries to keep their gardens supplied with flowering plants in pots throughout the year. The consequence was that a great deal of this produce was forced. As the season for homeward shipment depended entirely on the Tea crop, many of the plants shipped home were those which had lately been forced, and so lacked stamina for a long voyage home under difficult conditions. The various forms of *Paeonia Moutan* are good examples of this, while the varieties of *Azalea indica* which were so popular among wealthy gardeners in England appeared to be particularly susceptible to salt water. On the other hand, Camellias often survived, and so did Chrysanthemums.

That much could be done by care and forethought was proved on several occasions. Reeves was careful to establish his plants in his Canton garden for two months in the same

pots and soil in which they were to travel home. On one occasion he travelled home with his own consignment of 100 plants. He looked after them himself on shipboard, was careful not to take them ashore at St. Helena (apparently a common fault, as this rest on shore started them into forced growth and they were killed by salt and cold on reaching more northern latitudes), and in particular hastened them through the customs on arrival in the Thames, where delay was often prolonged, and fatal. Out of the original 100 plants, he brought 90 alive to England.

Dr. Livingstone was so impressed with Reeves' performance that he made a definite suggestion to Sabine that the Horticultural Society should send out a gardener to Macao where all plants for shipment might be properly acclimatised and prepared. The suggestion was not proceeded with, but the journals of John Damper Parks and John Potts, both of whom collected for the Horticultural Society in the 1820's, show clearly that they had taken this lesson to heart. There are entries for day after day taken up with potting and repotting plants in preparation for the voyage home.

The Chinese nurseries were in the habit of potting all their plants in the local soil with nothing added. This was a heavy clay which kept the moisture well during drought, but was totally unsuitable where the plants had to live in the same pots for many months on end with no chance of renewing the soil. In course of time a better and more porous medium was evolved, much more suitable for the glazed cases that soon became so popular.

Owing to the excessive cost of importing plants into England due to the great losses during the voyage, Lindley, then assistant secretary to the Horticultural Society, read a paper on the subject before the Society on November 5th, 1822. In this he recapitulated the importance of the proper establishment of plants before shipment. He also suggested that they should be packed in wooden cases with span roofs, which could be unscrewed and removed in fine weather so as

to allow light and air to get in. He also emphasised the necessity of constant sponging with fresh water of foliage and stems to remove any trace of salt. He was also insistent on the value of good quality tarpaulins to keep off salt water.

In this lecture he draws attention to the value of seed as a means of introducing new species. This may have been suggested to him by Dr. Livingstone, who was the head surgeon to the East India Company in Canton and Macao and a scientific horticulturist far ahead of his times. Before 1817 Livingstone was drying seed artificially in Leslie's Ice Machine which was worked by the action of sulphuric acid. Whether he had in this any idea of the comparatively new technique of stratifying seeds, I am not sure. He also suggested keeping small seeds and berries, such as *Berberis*, in sugar, obviously in a semi-crystallised state, a suggestion that might be used to-day in the case of seeds where the removal of a fleshy covering seems to have some definite action in shortening their viability. Lindley on his part also makes the excellent suggestion of sowing short-lived seeds in pots or boxes just before the ship sailed in the hopes that healthy seedlings might welcome the delighted consignee on the arrival of the ship in the Thames. This also might work well under certain conditions to-day.

For many years the use of the tightly closed wooden case persisted. Then came the era of the Wardian case, just as tightly closed or even more so, but with at least one glass side to let in light. All collectors who travelled with their plants were quite insistent on the importance of constant light and air whenever possible. Time and again you read of plants kept in the stuffy cabins dying before a quarter of the voyage was completed; and the same applies to the action of the salt in the forward part of the ship, where they were obviously much nearer to the spray coming over the bows.

The Wardian case was evolved for the triple purpose—of allowing the plant light, of conserving water (on the principle that water given off during the heat of the day would be kept

within the tightly closed case and condense on the inside of the glass during the cool of the night, ultimately reprecipitating on the plant and soil in the form of dew), and of keeping out all contact with salt.

As far as I can gather, the first man to use glass in a travelling case for plants was Sir Robert Farquhar, Governor of Mauritius, who sent plants home to England very successfully early in the nineteenth century in a case made locally in the colony with wooden sides and a top like a double-spanned greenhouse with sheets of glass let in.

Nathaniel Bagshaw Ward of Wellclose Square, London, was the man who brought the glazed travelling case to the peak of perfection. He published a book on his case in 1842 with a second illustrated edition ten years later. Robert Fortune was a great believer in Wardian cases and used eighteen of them on the conclusion of his first trip to China for plants collected for the Horticultural Society. While praising them on many occasions, he was frank in saying that they had to be extremely well made to be of real service. The wood had to be very thoroughly seasoned and the joints completely watertight to stand the extremes of temperature throughout the voyage without cracking and letting in sea water.

Another defect which he warned his readers against was constructing the cases with too short feet. This meant that when the decks were washed the sailors swilled the salt water over the bottom of the cases, whereas, if proper feet were fixed to give a clearance above deck of at least 6 inches, the sailors could clean underneath with their brooms.

He suggested that all plants should be established in the actual cases at least ten days before sailing, a very good proviso. After everything was planted in about 9 inches of soil wooden spars were nailed across to keep the plants in place, and moss spread on the surface of the soil to help to retain moisture. When Fortune travelled himself with his plants, he opened the cases on every fine day, but he states quite definitely that he never on any account left them open at

night; he gives no reason for this. In bad weather he left the cases permanently closed.

That the Wardian case was successful when used by such a skilled plantsman as Fortune is proved not only on his first expedition when out of 250 plants put into cases in China 215 were in good condition on landing in London after a voyage of almost five months, but also on his second trip to introduce China Tea into India for the East India Company. On this occasion also Wardian cases were used not only for the transport of seedling Tea plants but also as large seed boxes in which many thousand seeds germinated during the voyage. This method was adopted quite deliberately, as Tea seed is only viable for a short period. By this means Fortune introduced safely over 100,000 young Tea plants and seedlings to India.

I very much doubt if we have learned much fresh about the technique of plant introduction since Fortune's day. Indeed, considering the enormously increased speed of sea transport there might almost be a retrograde movement. Few modern expeditions have taken the trouble to send home living plants, relying almost entirely on seed. The introduction a few years ago by Mr. Thomas Hay of living plants of *Primula sonchifolia* in Bamboo pots from Upper Burma was so successful that it might have encouraged others to try similar treatment with other difficult plants, but little has been done.

Occasionally plants have been sent by air with great success, among them *Primula Edgeworthii* from India to the Royal Botanic Garden at Edinburgh, but air transport over long distances is a costly business. Plants have been sent out from the British Isles all over the world and been imported from many countries in the cool rooms of ocean liners, but that has been mostly a nursery business with plants specially established.

The same applies to seed. I remember having discussed suitable packing on several occasions with George Forrest. Several methods have been attempted from time to time in

order to try to preserve the viability of short-lived seeds; carbon dioxide, wax, thermos flasks, and so on. On the whole experiments have not been particularly promising. I cannot recall that any attempts have been made lately to sow seeds almost *in situ* and ship the seed pans or boxes home in the hopes of germination if not during the voyage at least shortly after arrival home. It is a method that should be worth trying.

L'ENVOI

So finishes a short account of plant collecting in, and plant introduction from, China. And so finishes an era in horticulture. Almost the whole of this book was planned and written before 1939 when gardening on the grand scale was still carried on, although diminishing each year.

Whatever the future may bring us I think that there will be no return to private horticulture on the same vast scale. Life will be simpler. There will be no estates where new plants from the Far East will be seen in arrays of hundreds or even thousands of the same or similar species, where greenhouses and frames will house serried ranks of seed pans and boxes.

In the more spacious days that are past the imagination of most gardeners, professional and amateur, was stirred by the thought of the richness of the Chinese flora. Every seed packet was sown and every seedling grown on with a facile optimism that was extremely resilient, however often it may have been temporarily shattered.

The reward of such patience was the first appearance in cultivation of some of the real beauties of the immense flora of China.

Let us hope that the future will not repress the desire of men to breast again the high hills in search of plants. For many years there have been grumbles that there is nothing fresh in the world to find in the way of plant life. The remark was passed by Veitch to Wilson at the beginning of the century; complaints were heard that Rock sent home hundreds of packets of seed from which little fresh was raised; Herbert Stevens travelled over a route that others had worked over several times before, and so found little that was new.

The finding of new plants, although exciting and satisfying, is only one angle of a plant collector's job. To extend

the range of species already known from other areas or to provide good material throwing light on variations is as important in the science of phytogeography as the discovery of new species.

There is still much to be found in China, and still more to be learned from China. This account deals with the foreign botanical exploration of that huge country. Let us hope that the next volume on the subject will deal with what the Chinese have been able to do themselves in a peaceful and prosperous China *resurgens*.

E. H. M. Cox.

GLENDICK,
May, 1945.

THE END

INDEX

- Abel, Dr. Clarke, 50, 51, 214.
Abelia chinensis, 51.
Abies brachyphylla, 96, 104.
 — *Delavayi*, 30, 145, 207.
 — *Fargesii*, 142.
 — *Forrestii*, 168.
 — *Mariesii*, 104.
 — *Veitchii*, 104.
Acer capillipes, 95.
 — *Davidii*, 142, 145, 168.
 — *Forrestii*, 168.
 — *ginnala*, 193.
 — *griseum*, 18, 141, 142.
 — *Henryi*, 109.
 — *Hersii*, 209.
 — *nikoense*, 95.
 — *rufinerve*, 95.
 — *trifidum*, 41.
 — *Wardii*, 190.
Actinidia chinensis, 142, 145.
 — *kolomikta*, 192.
Actinotinus sinensis, 108.
Aesculus chinensis, 193.
Ailanthus altissima (glandulosa), 42, 44.
 Aiton, W. T., 49.
 Alexander, W. T., 72.
Allium Beesianum, 168.
 — *cyaneum*, 127.
 — *Farreri*, 175.
 — *kansuense*, 127.
 Amherst, Lord, 38, 50.
Amorphophallus Mellii, 210.
 Anderson, J., 99.
Androsace spinulifera, 163.
Anemone japonica, 85.
Ardisia punctata, 58.
Arundinaria Murielae, 148.
 — *nitida*, 130.
Asarum caudigerum, 105.
Aspidistra elatior, 59.
 — *punctata*, 59.
Aster Delavayi, 118.
Aster Farreri, 176.
 — *Forrestii*, 168.
Astilbe Davidii, 142.
 — *koreana*, 149.
Azalea indica, 66.
 — *Kurume*, 148.
Azaleas, 66.
 Baber, E. C., 100.
 Bailey, Prof. L. H., 195.
 Balfour, Sir I. B., 154.
 Banks, Sir Joseph, 47, 215.
 Beale, D., 51.
 — T., 51, 87.
 Bean, Soya, 193.
 Beaupré, C. G., 67.
Belamcanda chinensis, 42.
 Bentham, George, 72, 73.
Berberis Bealei, 87.
 — *calliantha*, 190.
 — *dasytachya*, 175.
 — *Gagnepainii*, 145.
 — *hypokerina*, 190.
 — *polyantha*, 135, 145.
 — *Sargentiana*, 146.
 — *Vernae*, 148.
 — *verruculosa*, 145.
 — *Wilsonae*, 145.
Berezooski, 128, 129.
Betula Delavayi var. *Forrestii*, 168.
Bignonia grandiflora, 48.
 Blake, J. B., 43.
 Blancard, M., 61.
Bocconia cordata, 46.
 Bonvalot, G., 122.
 Bourdonnet, Père, 120.
 Bourne, F. S. A., 106.
 Bretschneider, Emil., 12, 15, 47, 93, 130.
 Briffaud, M., 122.
Buddleia alternifolia, 128, 175.
 — *asiatica*, 146.
 — *Davidii magnifica*, 142.

- Buddleia Fallowiana*, 168.
 — *nanhoensis*, 175.
 — *variabilis*, 120.
 Bulley, A. K., 154, 159.
 Bunge, A. von., 67.

Callicarpa longifolia, 58.
 — *rubella*, 58.
Camellia japonica, 42, 48, 65.
 — *reticulata*, 55, 58.
Camellias, 65.
 Cantor, T., 72.
Carrieria calycina, 119.
Cassiope selaginoides, 145.
Catalpa Duclouxii, 204.
 Cavalerie, P. J., 204.
Celastrus articulatus, 131.
Celtis koratensis, 209.
Ceratostigma plumbaginoides, 68.
Cercidiphyllum japonicum var. *sinense*, 146.
Chamaerops Fortunei, 86.
 Champion, Capt. J. G., 73.
 Chandler, Alfred, 65.
 Charles, W. R., 103.
Chrysanthemum erubescens, 59.
 — *hortorum*, 59.
 — *indicum*, 60.
 — *japonense*, 60.
 — *lavendulifolium*, 60.
 — *Makinoi*, 60.
 — *morifolium*, 59.
 — *naktongense*, 60.
 — *Pompom*, 86.
 — *rubellum*, 60.
 — *satsumense*, 60.
 — *sinense*, 59, 62.
 — *vestitum*, 60.
Chrysanthemums, 41, 58, 59-64, 90.
Clematis Armandii, 142.
 — *Davidiana*, 115.
 — *macrosepala*, 68.
 — *Meyeniana*, 67.
 — *montana rubens*, 142.
Clerodendron Bungeanum, 68.
 — *foetidum*, 68.
 — *trichotomum*, 96.
Clethra Delavayi, 168.

Coelogyne fimbriata, 59.
Codonopsis convolvulacea, 99.
 — *Meleagris*, 168.
 Colvill, J., 62.
Conandron ramondoides, 104.
 Cooper, T. T., 99.
Cornus kousa sinensis, 141, 146.
Corylopsis pauciflora, 95.
Cotoneaster conspicua, 190.
 — *Dammeri*, 142.
 — *Dielsiana*, 142.
 — *divaricata*, 146.
 — *salicifolia*, 114.
 — *salicifolia* var. *floccosa*, 146.
 — *Wardii*, 190.
Cryptomeria japonica, 86.
 Cunningham, J., 39, 40-42, 61.
Cunninghamia sinensis, 41.
Cupressus funebris, 46, 87.
Cyananthus lobatus var. *insignis*, 190.
 — *Wardii*, 190.
Cycas revoluta, 43.
Cynoglossum amabile, 168.

Daphne retusa, 135.
 — *tangutica*, 127.
 David, J. P. A., 24, 112-115.
Davidia involucrata, 114, 138, 139, 142.
Decaisnea Fargesii, 119.
 de Deken, Père, 122.
Deinanthoe coerulea, 109.
 Delavay, J. M., 15, 94, 115-118.
Delphinium likiangense, 168.
Dendrobium nobile, 56.
Deutzia discolor, 109, 118.
 — *scabra*, 91.
Dianthus chinensis, 42.
Diapensia purpurea, 209.
Dicentra spectabilis, 86.
Diervilla florida, 85.
 D'Incarville, P. N., 44.
Dipelta floribunda, 128, 142.
Disanthus cercidifolius, 95.
 d'Orleans, Prince Henri, 121-123.
Dracocephalum bullatum, 30.
 — *Forrestii*, 168.
 — *Isabellae*, 168.

- Dryander, J., 47.
 Dubernard, Père, 121.
 Ducloux, F., 203.
 Dugrité, M. 113.

Emmenopterys Henryi, 109.
Enkianthus campanulatus, 104.
Eomecon chionantha, 105.
Epigaea asiatica, 95.
Euonymus Bungeanus, 68, 192.
 Evans, Thomas, 48.
Evodia hupehensis, 146.
Exochorda Giraldui var. *Wilsonii*, 147.

 Faber, Rev. E., 105.
 Fabre-Tonnerre, C., 94.
 Farges, P. G., 119.
 Farquhar, Sir R., 219.
 Farrer, Reginald, 22, 170-179.
 Faurie, U., 121.
 Filchner, W., 205.
 Ford, Charles, 104.
Forsythia ovata, 149.
 — *viridissima*, 86.
 Forrest, George, 29, 30, 121, 152-169.
 Fortune, Robert, 63, 74-92, 219.
 Franchet, M. A., 111, 116.
Fraxinus chinensis, 106.
 Fulford, H., 103.
 Futterer, K., 205.

Gardenia florida, 87.
Gaultheria Forrestii, 168.
 — *trichophylla*, 32.
 — *Wardii*, 190.
 Genestier, Père, 186.
Gentiana Farreri, 176.
 — *giloostriata*, 190.
 — *hexaphylla*, 130, 176.
 — *sino-ornata*, 167, 168.
 — *straminea*, 127.
 — *trichotoma*, 135.
Geranium napuligerum, 118.
 Gill, W. J., 101, 102.
 Gregory, W., 94.
 Greville, C. F., 48.
 Grijx, C. F. M. de, 94.
 Grjmailo, Grum, 130.

Hamamelis mollis, 104.
 Hance, H. F., 92-94, 102, 115.
 Hancock, W., 108.
 Haxton, John, 45, 48.
 Hay, T., 220.
 Heim, Prof. A., 201.
 Henry, Augustine, 106-110, 138.
 Henry, Rev. B. C., 103.
 Hers, J., 208, 209.
Hibiscus Manihot, 41.
 Hinds, R. B., 73.
 Hooper, 50.
 Horticultural Society, 15, 52, 55, 56, 75.
 Hosie, Sir Alex., 106.
 Hume, Sir A., 47, 62.
 Hummel, Dr. D., 205.
 Hutchinson, Capt., 43.
Hydrangea macrophylla (hortensis), 47.
 — *Sargentiana*, 141, 147.
Hypericum patulum, 95.
 — *patulum* var. *Forrestii*, 168.
 — *patulum* var. *Henryi*, 109.

Incarvillea Delavayi, 44, 118, 168.
 — *grandiflora*, 119, 122.
Ilex cornuta, 86.
 — *Pernyi*, 111.
Illicium verum, 105.
Iris chrysographes, 167, 168.
 — *Forrestii*, 168.
 — *japonica*, 47.

 James, H. E. M., 103.
Jasminum nudiflorum, 68, 85.
 — *primulinum*, 27, 139.
 Jeridot, Père, 110.
Juglans Duclouxiana, 204.
Juniperus Coxii, 177.
 — *squamata* var. *Meyeri*, 193.

 Kamel, G. J., 36.
 Kashkarov, 129.
 Kerr, W., 49.
Kerria japonica, 49.
 Keswick, W., 91.
 Kirilov, P. Y., 68.
Koelreuteria paniculata, 42.

Kolkwitzia amabilis, 192.
Kozlov, P. K., 126.
Kricheldorf, Herr, 133.
Kuznetsov, I., 68.

Larix Potaninii, 130.
— *Principis Ruprechtii*, 209.
— *tibetica*, 30.
Lay, G. T., 67.
Leontopodium aloysiodorus, 176.
— *haplophylloides*, 176.
Léveillé, H., 93.
Ligustrum, lucidum 47, 106.
— *Quihoui*, 112.
Lilium auratum, 91.
— *centifolium*, 109.
— *Brownii* var. *colchesteri*,
— *concolor*, 48.
— *Davidii*, 114, 148.
— *Duchartrei*, 114, 176.
— *Farreri*, 176.
— *giganteum*, 119.
— *Henryi*, 109.
— *japonicum*, 49.
— *leucanthum* var. *centifolium*, 109,
176.
— *ochraceum*, 118.
— *philippinense formosanum*, 150.
— *regale*, 49, 148.
— *Sargentiae*, 148.
— *speciosum*, 150.
— *speciosum* var. *gloriosoides*, 104.
— *Thunbergianum*, 104.
— *tigrinum*, 47, 49.
— *Wardii*,
— *Willmottiae*, 148.
Limestone, 29, 162.
Limpricht, W., 24, 209.
Lindley, J., 55, 57, 217.
Linnaeus, 36.
Livingstone, J., 49, 51, 52, 216, 217,
218.
Lonicera flexuosa, 49.
— *fragrantissima*, 85.
— *nitida*, 147.
— *syringantha*, 127.
Loropetalum sinensis, 41.
Lycium chinenses, 44.

Macartney, Lord, 38, 44.
McCarthy, Rev. J., 101.
Macleaya cordata, 46.
Magnolia conspicua, 47, 48.
— *Delavayi*, 118, 142, 168.
— *stellata*, 95.
— *Wilsonii*, 147.
Maidstone, N., 40, 41.
Maire, E. E., 204.
Malus theifera, 142.
— *toringoides*, 145.
Margary, A. R., 100.
Maries, C., 103, 104.
Matricaria indica, 61.
Maughn, Lt., 51.
Maximowicz, C. J., 92, 95, 96.
Mazzetti, H., 206-208.
Mean, James, 47.
Meconopsis betonicifolia, 118, 190.
— *chelidonifolia*, 122.
— *integrifolia*, 30, 127, 138, 142, 143,
145.
— *punicea*, 127, 143, 145.
— *quintuplinervoid*, 127, 175.
— *violacea*, 190.
Mell, R., 210.
Mesny, W., 101, 102.
Meyen, F. T. J., 67.
Meyer, F. N., 192-194.
Millet, C., 67.
Miquel, F. A. W., 93.
Monbeig, Père, 120.

Nandina domestica, 49.
Nelson, D., 215.
Nomocharis aperta, 168.
— *basilissa*, 178.
— *Farreri*, 177.
— *Mairei*, 168, 204.
— *pardanthina*, 118, 168.
— *saluenensis*, 120, 168.
— *Souliéi*, 120.
Nymphæa pygmaea, 49.

Obruchev, 129.
Oldham, R., 98.
Ophalogramma Rockii, 202.
— *vincæflora*, 118, 179.

- Orange, Sweet, 35.
 Orta, G. da, 35.
Osmanthus Delavayi, 118.
 — *ilicifolius*, 91.

Paeonia Delavayi, 118, 168.
 — *obovata*, 95.
 — *suffruticosa* (Moutan), 47, 50, 65, 86
 var. *papaveracea*, 48.
 Palmer, T., 55.
Panax Ginseng, 68.
 Parker, E. H., 106.
 Parks, J. D., 58.
 Peony, Tree, 50.
 Pereira, Gen., 196.
 Perny, P. H., 111.
 Peronne, M., 28.
 Pevtsov, Capt., 127.
Philadelphus Wilsonii, 145.
Picae asperata, 148.
 — *Meyeri*, 197.
Pieris Forrestii, 168.
 — *taiwanensis*, 150.
Pinus Armandii, 30, 141.
 — *Bungeana*, 68, 212.
Platycodon grandiflorum, 86, 104.
Polygonum chinense, 46.
 — *lichiangense*, 168.
 Poole, 50, 62.
Populus lasiocarpa, 145.
 Potanin, G. N., 128-130.
Potentilla fruticosa, 22, 142.
 — *Veitchii*, 142.
 Potts, J. 58.
Primula Agleniana, 178.
 — *alpicola*, 190.
 — *Beesiana*, 169.
 — *Bulleyana*, 167, 169.
 — *burmanica*, 190.
 — *calliantha*, 30.
 — *chionantha*, 169.
 — *chungensis*, 190.
 — *Cockburniana*, 135, 145.
 — *dryadifolia*, 32.
 — *Dubernardiana*, 121.
 — *Edgeworthii*, 220.
 — *Florindae*, 190.
 — *Forbesii*, 118.

Primula Forrestii, 30, 169.
 — *helodoxa*, 169.
 — *heucherifolia*, 114.
 — *japonica*, 91.
 — *Littoniana*, 30, 159, 169.
 — *malacoides*, 118, 169.
 — *malvacea*, 163.
 — *nutans*, 118, 167, 169.
 — *obconica*, 103, 104.
 — *Poissonii*, 118.
 — *pulchella*, 163.
 — *Rockii*, 202.
 — *secundiflora*, 30, 169.
 — *sinensis*, 55, 58, 103.
 — *sonchifolia*, 30, 178, 220.
 — *Souliéi*, 120.
 — *Veitchii*, 145.
 — *vittata*, 122, 145.
 — *violodora*, 141.
 Pratt, A. E., 110, 122, 132-135.
Prunus Mume, 51.
 — *tomentosa*, 193.
 — *triloba*, 68, 89.
 Przewalski, N. M., 125-127.
 Purdom, W., 174.
 Pyltsov, Lt., 125.

 Rawes, Capt., 55.
 Reeves, John, 51-56, 75, 217.
 — J. R., 56.
Rheum Alexandrae, 145.
Rhododendron ambiguum, 144.
 — *aperantum*, 178, 190.
 — *argyrophyllum*, 144.
 — *arizelum*, 169.
 — *Augustinii*, 109, 141, 147.
 — *auriculatum*, 109.
 — *brachycarpum*, 96.
 — *calophytum*, 114, 144, 145.
 — *calostrotum*, 177, 190.
 — *caloxanthum*, 177.
 — *chaetomallum*, 169, 178.
 — *Championae*, 73.
 — *charitopes*, 178.
 — *chartophyllum*, 163.
 — *chryseum*, 190.
 — *ciliicalyx*, 118.
 — *concinnum*, 144.

Rhododendron cyclium, 169.

— *Davidii*, 114.

— *decorum*, 114.

— *diaprepes*, 169.

— *didymum*, 169.

— *discolor*, 119, 142.

— *eclectum*, 166.

— *Faberi*, 144.

— *facetum*, 190.

— *Fargesii*, 119, 142.

— *fastigiatum*, 118.

— *fictolacteum*, 169.

— *floccigerum*, 165.

— *Fortunei*, 89, 163.

— *fulvum*, 169.

— *giganteum*, 169.

— *Griersonianum*, 167, 169.

— *haematodes*, 165.

— *impeditum*, 169.

— *imperator*, 190.

— *insigne*, 19, 144.

— *intricatum*, 30, 145.

— *irroratum*, 118.

— *Kyawi*, 178.

— *lacteum*, 169.

— *lepidotum*, 163.

— *lutescens*, 145.

— *mallotum*, 190.

— *megacalyx*, 190.

— *mollicomum*, 169.

— *moupinense*, 114, 144.

— *mucronulatum*, 68, 131.

— *mulienae*, 169, 196.

— *myrtilloides*, 190.

— *neriiflorum*, 169.

— *niphargum*, 190.

— *obtusum*, 86.

— *ochraceum*, 144.

— *Oldhamii*, 98.

— *orbiculare*, 145.

— *oreotrephe*, 169.

— *pemakoense*, 190.

— *praecox*, 163.

— *Prattii*, 135.

— *prostratum*, 30.

— *puralbum*, 169.

— *racemosum*, 118, 163, 165.

— *radicans*, 169.

Rhododendron ramosissimum, 120.

— *repens*, 167, 169.

— *rhombicum*, 96.

— *Rockii*, 202.

— *Sargentianum*, 30, 144, 145.

— *scintillans*, 169.

— *scyphocalyx*, 169.

— *Searsiae*, 144.

— *Simsii*, 66.

— *sinogrande*, 169.

— *Souliei*, 120, 145.

— *sperabile*, 177.

— *strigillosum*, 114, 144.

— *sutchuenense*, 119.

— *tephropeblum*, 190.

— *tsangpoense*, 190.

— *Valentinianum*, 169.

— *venator*, 190.

— *villosum*, 144.

— *Wardii*, 190.

— *Weyrichii*, 149.

— *Williamsianum*, 144, 147.

— *Wiltonii*, 144.

— *yanthinum*, 122.

— *yunnanense*, 118.

Rhodoleia Championii, 73.

Rhus semialata, 41.

Ribes Henryi, 109.

Ricci, Matthaeus, 36.

Rice, Cochinchina, 43.

Roborovski, Lt., 126.

Rock, J. J., 23, 129, 195-202.

Rockhill, W. W., 134.

Rodgersia podophylla, 104.

Rosa Banksiae, 49, 59.

— *bracteata*, 46.

— *Farreri*, 176.

— *Helenae*, 147.

— *Moyesii*, 145.

— *multiflora*, 48.

— *omeiensis*, 145.

— *Willmottiae*, 145.

— *xanthina*, 192.

Roscoeae cauleoides, 169.

— *Humeana*, 169.

Roux, Lt., 122.

Sabine, J., 57, 62.

- Salisbury, R. A., 57.
Salix magnifica, 147.
 Salter, J., 63.
 Sampson, T., 98.
 Sargent, Prof., 138, 195.
Sapium sebiferum, 42, 43.
 Scassi, M., 128.
 Schneider, C., 206, 207.
Sciadopitys verticillata, 91.
Senecio clivorum, 142.
 Shunda, China, 40.
 Simon, G. E., 111.
 Sladen, Sir P., 99.
 Slater, G., 48.
 — J., 48.
 Sloane, Sir H., 40, 41, 64.
Smilax glabra, 35.
 Smith, Dr. H., 14.
 Smith, K. A. H., 211-213.
 Smith, Sir W. W., 11.
Solanum indicum, 40.
Sorbus Harrowiana, 169.
 — *munda*, 145.
 Sosnovski, Capt., 127.
 Soulié, J. E., 119, 120.
Spiraea arborea, 147.
 — *trichocarpa*, 149.
Staphylea holocarpa, 19, 147.
 Staunton, Sir George L., 44-46.
 Staunton, Sir George Thomas, 45, 50.
 Stevens, Herbert, 190.
Stewartia koreana, 149.
 — *Pseudo-camellia*, 95.
Stranvaesia Davidiana, 114, 142.
 — *undulata*, 142.
Styrax Hemsleyanum, 142.
 — *Obassia*, 104.
 — *Wilsonii*, 147.
 Swinhoe, R., 98.
Syringa Meyeri, 193.
Syringa villosa, 131, 193.
Taiwania cryptomerioides, 149, 208.
Taraktogenos Kurzii, 195.
 Tarrant, W., 94.
 Tatarinov, A. A., 95.
 Tea, 86, 88.
Thalictrum dipterocarpum, 118, 145, 169.
Thuja orientalis, 44.
Tsuga yunnanensis, 30, 145, 207.
 Turczaninov, A., 68.
 Turner, C. H., 55.
 Vachell, Rev. G. H., 67.
 Veitch and Sons, J., 103, 138.
 Veitch, J. G., 91.
Viburnum betulifolium, 130.
 — *Carlesii*, 103.
 — *Davidii*, 114, 145.
 — *fragrans*, 174, 176.
 — *Henryi*, 109, 147.
 — *macrocephalum*, 193.
 — *rhytidophyllum*, 109, 142.
 — *theiferum*, 134.
 — *utile*, 103.
 Ward, F. Kingdom, 28, 180-191.
 Ward, N. B., 219.
 Warner, R., 43.
 Watters, T., 103.
 Weddell, Capt., 37.
 Wellbank, Capt. T., 55, 66.
Weigela rosea, 85.
 Wilford, C., 74, 94.
 Williams, J. C., 154, 159.
 Wilson, E. H., 18, 25, 136-151.
Wistaria sinensis, 55.
 Wright, C., 74.
 Younghusband, Sir F., 103.

